ALSO IN OUR NEWS SECTION
- Intel launches Centrino mobile technology with not-so-state-of-the-art Wi-Fi. Page 6
- U.S. brokerage industry hit by costs of complying with antiterrorism act. Page 12

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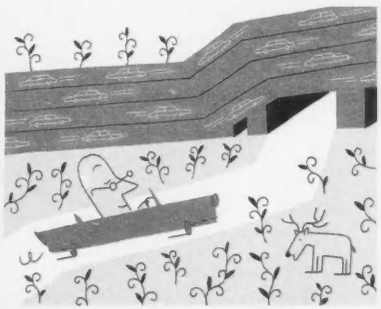
KNOWLEDGE CENTER
OPERATING SYSTEMS

# In the Slow Lane



CYRIL CABRY

**SPECIAL REPORT** Far from the leading edge, thousands of IT managers are trying to figure out how to exploit the Linux phenomenon, switch from IBM's older operating systems to z/OS or upgrade from Microsoft's aging Windows NT Server. Here's a rare look at those users on the lagging edge. **Stories begin on page 27.**

**Online Exclusive**
Five things every IT manager should know about Linux:
QuickLink 36148
computerworld.com

# Billions Needed to Meet Drug Bar-Code Mandate

## FDA order targets drug makers, but hospitals will have to pay for underlying IT infrastructure

BY BOB BREWIN

The Food and Drug Administration last week mandated that drug companies put bar codes on all drugs dispensed in hospitals as a means of reducing medication errors. Hospitals welcomed the prospect of error reduction, even though as an industry they will have to spend billions to deploy the technology.

The regulations apply only to drug manufacturers and not to hospitals. But as a practical matter, hospitals will need bar code readers and the networks and systems to support them.

The FDA put the cost of deploying those systems at about $7.2 billion.

Hospitals don't appear to be balking at the hefty price tag, because many see it as a worthwhile investment.

**IT SPENDING**

Richard Coorsh, a spokesman for the Federation of American Hospitals, a Washington-based association of large, investor-owned hospital companies, said his organization has solidly backed the bar-code regulations. "We believe it will improve care and save lives," he said.

The FDA requirement for standard bar codes will save money for hospitals that have already started to deploy medication management systems, according to Jane Englebright, vice president of quality at HCA Inc. in Nashville. In testimony at an FDA hearing last year, Englebright said the lack of standard bar codes required hospitals to repackage and add

*Bar Codes, page 61*

# IBM Expands Content Offerings

## Software upgrade ties electronic documents to CRM applications

BY CRAIG STEDMAN
SOMERS, N.Y.

IBM last week announced upgrades of two content management tools and said it will ship additional features later this year as part of an effort to broaden its support for managing corporate information other than relational data.

Janet Perna, general manager of IBM's data management division, said at a briefing here that the company's flagship DB2 database is being used under the hood of the content management technologies. But the DB2 product line now "means much more than the database," she added.

For example, IBM in September shipped Version 8 of its DB2 Content Manager package, which was rewritten from the ground up to improve scalability and add features such as tighter ties to DB2 and to the company's WebSphere Application Server software. Last week, IBM said it plans to release another

*IBM, page 61*

**IBM'S DATA CHIEF TALKS CONTENT**

Janet Perna predicts user demand for content management software will rival that for databases. Page 61

# IT Systems at U.S. Borders Found Lacking

## Nation challenged to build infrastructure to support biometrics

BY DAN VERTON
WASHINGTON

The prospect of war in Iraq has raised new concerns about the Department of Homeland Security's progress in deploying the IT infrastructure needed to improve border security.

Testifying at a Senate Judiciary Subcommittee hearing last week, Asa Hutchinson, the department's undersecretary for border and transportation security, said the DHS would likely meet the Dec. 31 deadline for deploying a new entry/exit system at the nation's airports and seaports. But he said the 2004 and 2005 deadlines for deploying the full array of IT systems along the land borders with Canada and Mexico could prove too difficult and expensive to meet.

*Border Security, page 16*

NEWSPAPER

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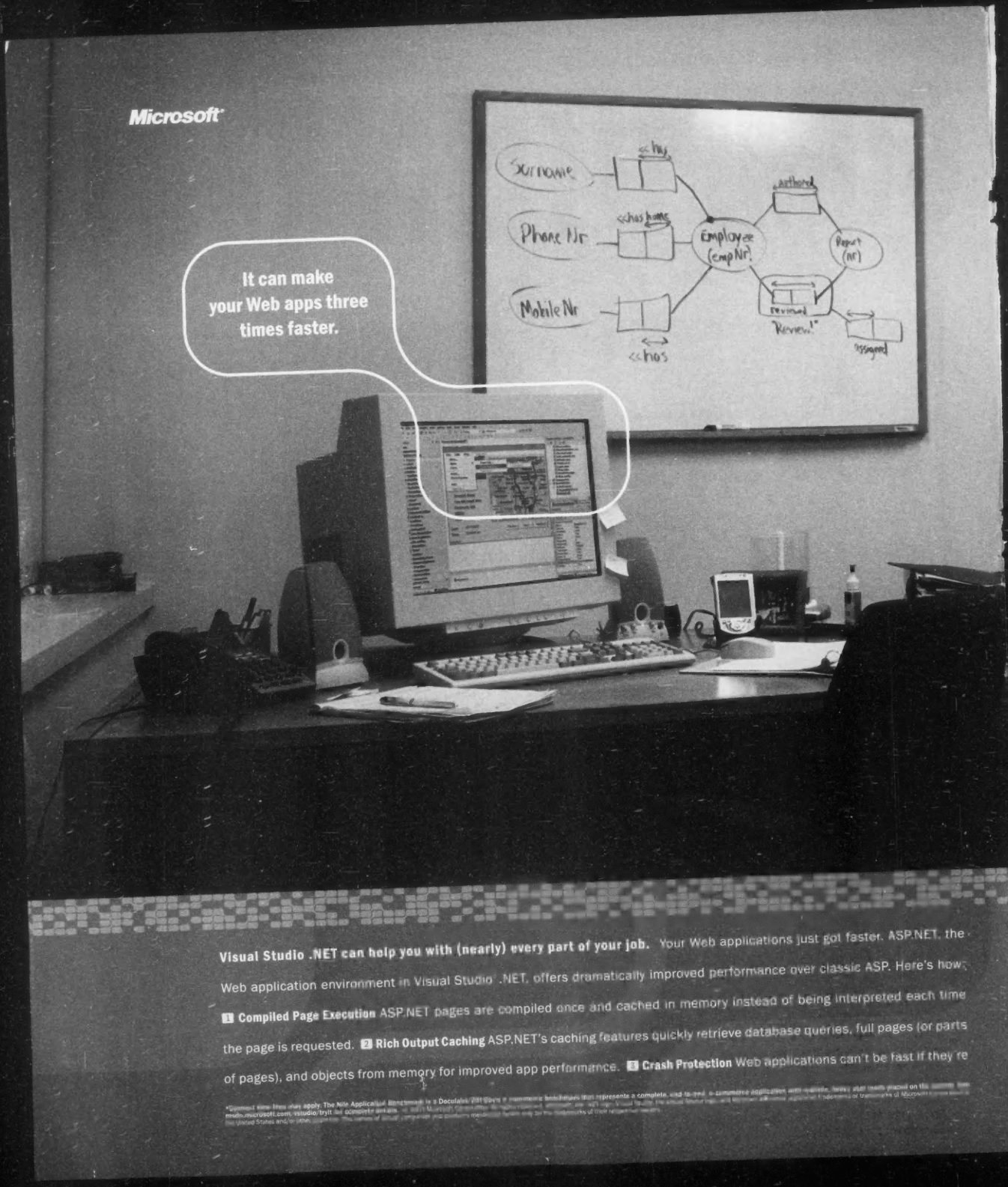
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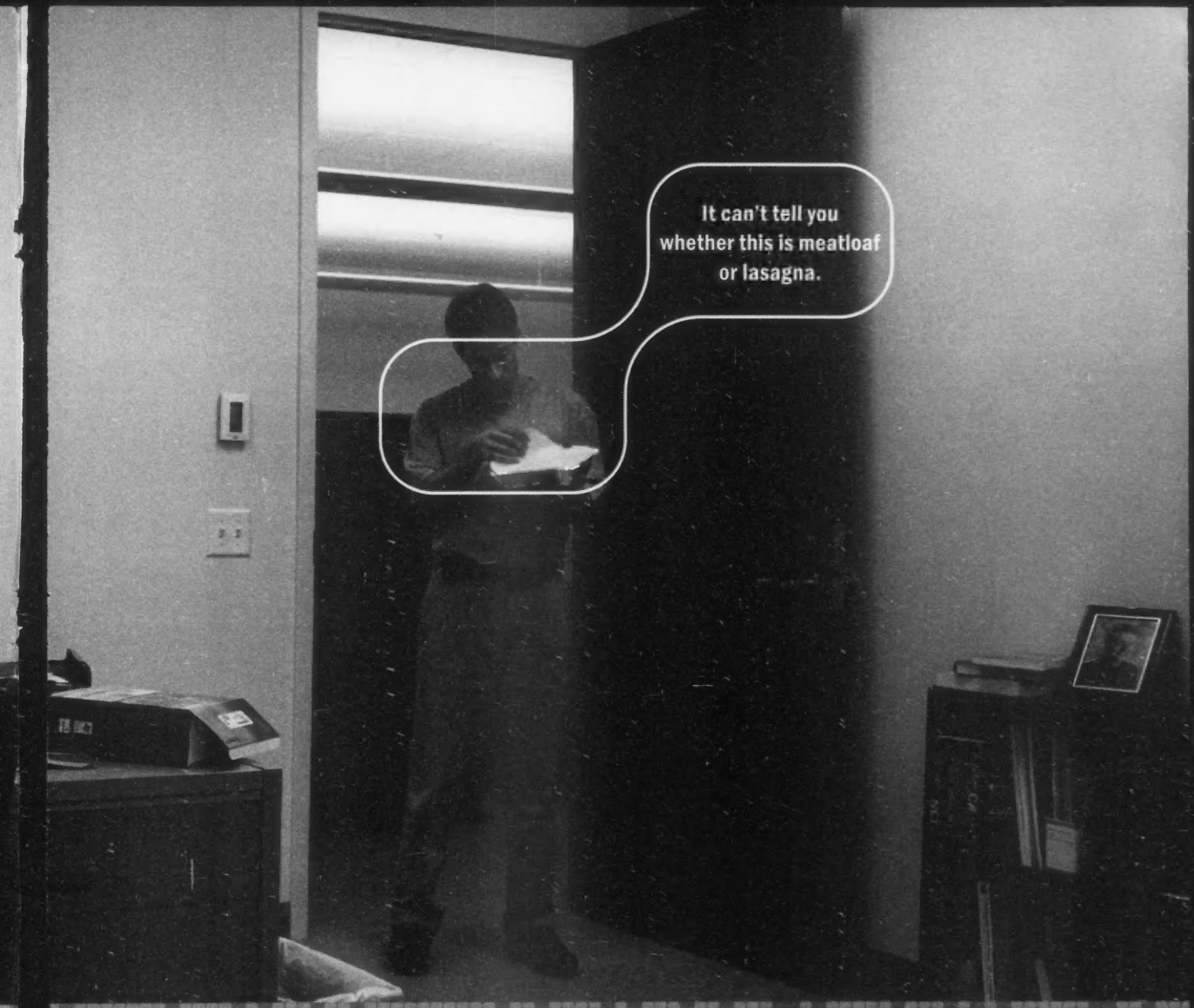


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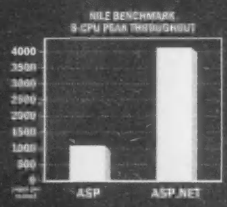

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03.17.03

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## ONLINE

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CYRIL CABRY

## KNOWLEDGE CENTER OPERATING SYSTEMS

# In the Slow Lane

Leading-edge users have already moved to Linux, z/OS and the latest Windows. Then there's the rest of us. This special report provides useful information for the legions of lagging-edge users who are new to Linux or haven't yet moved to the latest versions of the server operating systems from IBM and Microsoft.

SPECIAL REPORT

PACKAGE BEGINS ON PAGE 27.


**30 The Story So Far.** The development of operating systems began in 1955, when General Motors created a batch-processing monitor.

**34 Still on Windows NT.** Despite Microsoft's best efforts to push them into upgrades, legions of Windows NT Server users aren't ready to move up or haven't finished their migrations. Some say that NT 4.0 works just fine, thank you.

**36 Time Is Running Out.** The clock is ticking for users of IBM's OS/390 mainframe operating environment to move to the 64-bit z/OS.

**40 Getting Started With Linux.** Not every IT shop is rushing to install Linux. Many are just starting to explore the open-source phenomenon, so here's a guide to practical issues such as version control, backup, fail-over and support. **ONLINE:** A collection of Linux Web sites, including those of vendors such as IBM, HP, Red Hat, SCO and SuSE. QuickLink 36275

**42 QuickStudy:** A primer on Logical Volume Manager, a software tool that allows storage drive space to be added or expanded on the fly, without system reboots or shutdowns.

**44 Strength in Numbers?** Individually they lack the market penetration of Red Hat, but together the four companies of the UnitedLinux alliance have shown progress by sharing costs and creating common support and call centers for customers.

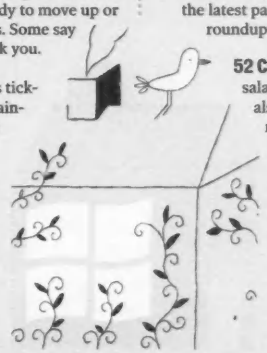
**46 The Worldwide Code Rebellion.** Many foreign governments are encouraging their IT managers to use open-source software. It's a powerful movement whose roots include anger over licensing terms set by U.S. vendors and concern about being locked into proprietary formats. **ONLINE:** The European Commission's top software policy official discusses open-source initiatives in Europe. QuickLink 36441

**48 Opinion:** For IT strategists, the operating system debate is all but dead, says columnist Mark Hall.

**50 The Almanac:** The "meta operating system," books about Windows Server 2003 and information on the latest patents are included in this eclectic roundup of OS research and resources.

**52 Careers:** A look at skills, training and salary information for Linux professionals. **ONLINE:** Linux adoption is on the rise, but don't expect to see a hiring boom in the field. The ease of learning Linux means existing personnel are being retrained. QuickLink 36551

**54 The Next Chapter:** In a collection of predictions about server operating systems, pundits say that the OS will become vital to Web services. And that Linux will become hugely successful, but fragmented like Unix.

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**What You Should Know About Linux**
Is Linux good enough for your organization? Columnist Timothy Witham outlines five points to keep in mind as you weigh your options.
QuickLink 36148

**How to Integrate Linux With Unix**
The SCO Group's senior vice president of technology walks you through a few simple approaches for using Linux and Unix together to strengthen your corporate IT strategy.
QuickLink 36824

**Learn to Make Platforms Get Along**
Avanade's Christopher Burry offers advice on how to get application development and infrastructure platforms to work together.
QuickLink 36900

## AT DEADLINE

### Symbol Says SEC May File Charges

**Symbol Technologies Inc., a maker of bar code scanners and other wireless devices, said it was notified that the U.S. Securities and Exchange Commission may push for civil charges against the company as part of an accounting investigation. Holtsville, N.Y.-based Symbol also delayed until June a planned restatement of its financial results dating back to 1999.**

### Intel Rolls Out Ethernet Devices

**Intel Corp. today will announce a series of Ethernet networking devices, including a Gigabit Ethernet controller for PCs and a 10 Gigabit Ethernet network interface card for servers. The interface card costs $7,995 and is designed to connect LAN-based servers to corporate networks so they can run bandwidth-hungry applications such as imaging, according to Intel officials.**

### White House Taps Coca-Cola IT Exec

**Bush administration officials said that the president plans to name Robert Liscouski, currently director of information assurance at The Coca-Cola Co. in Atlanta, to be assistant secretary of infrastructure protection within the new U.S. Department of Homeland Security. Liscouski's appointment could be announced as early as this week, sources said.**

### Short Takes

**IT consulting firm ACCENTURE LTD. said it laid off about 760 employees, primarily in the U.S. The cuts reduced the company's workforce by 1%, but Accenture said it expects a net increase in head count during its current fiscal year. . . . WORLDCOM INC. said it wrote off $79.8 billion worth of financial goodwill and other assets as part of its bankruptcy proceedings.**

# Intel Launches Centrino; Wi-Fi Support Still Lags

## Mobile technology can access only older 802.11b nets

BY BOB BREWIN

INTEL CORP. launched its much-heralded Centrino mobile technology last week. But unless users are willing to accept relatively slow Wi-Fi access, they will have to wait until the next quarter to get notebooks certified by Intel as Centrino-compatible.

Centrino consists of a newly designed, low-power-drain Pentium-M chip set and a PRO/Wireless mini-PCI card that handles Wi-Fi connectivity. Intel will offer four standard versions of the Pentium-M running at speeds of 1.6, 1.5, 1.4 and 1.3 GHz.

Intel has touted the Wi-Fi capabilities of its Centrino architecture and has made high-profile partnerships with Wi-Fi public-access networks and operators [QuickLink 36929]. But Centrino's built-in Wi-Fi can access only older 802.11b wireless networks, which transmit raw data at a rate of 11M bit/sec. It doesn't support the Wi-Fi 802.11a or 802.11g standards, both of which provide 54M bit/sec. data speeds.

"We had originally planned to introduce Centrino with dual-band, both 'a' and 'b,' " Daniel Francisco, an Intel spokesman, said on Friday. "We announced in December that the dual band would be delayed due to us having to do some additional engineering on 'a.' We will have dual-band [802.11 a and b] out by the end of the second quarter of 2003. As for 'g' we believe an a/b/g tri-band solution makes sense, and we'll look at it when the 'g' specification is completed." The Wi-Fi Alliance expects to start certifying 802.11g products this summer.

Rich Redelfs, president and CEO of Atheros Communications Inc., a wireless LAN chip manufacturer in Sunnyvale, Calif., said notebook vendors have the option of using the Pentium-M processor that's at the heart of the Centrino technology with Atheros 802.11a/b WLAN chip sets now, and with 802.11g or combined 802.11a/b/g chip sets in the near future.

Major hardware manufacturers that have signed on to use the Atheros 802.11 chip sets include Hewlett-Packard Co., IBM, Toshiba Corp. and NEC Corp. But Intel — which is backing the Centrino launch with a $300 million advertising campaign — won't allow manufacturers to slap a "Centrino-compatible" logo on their products unless they incorporate both the Pentium-M processor and its Wi-Fi module. IBM and HP, in addition to offering the Atheros option, are among the top-tier notebook vendors that offer fully compatible Centrino products.

Many large enterprise users view Wi-Fi as a business essential. Tony Scott, chief technology officer at General Motors Corp., said he plans to support thousands of traveling workers with Wi-Fi. Scott called the increase in battery life promised by Centrino a "great step forward" and noted that GM intends to upgrade wireless LANs in its plants from 802.11b to 802.11g.

Analysts expect Intel to eventually incorporate all three Wi-Fi standards into the Centrino architecture, and they view that as the beginning of the end of outboard Wi-Fi packaged in a PC Card. Keith Waryas, an analyst at IDC in Framingham, Mass., said the use of PC Cards for wireless LAN connectivity "will eventually go away" as Centrino-equipped notebooks replace older models.

**INTEL'S CENTRINO TIMELINE**

**OCT 2000** — Announces that Banias will use a mini-PCI card that can support only 802.11b Wi-Fi because of engineering problems with a chip meant to support the 802.11a standard.

**DEC 2002** — Forms Cometa Networks with AT&T Corp. and IBM to develop a nationwide Wi-Fi network.

**JAN 2003** — Announces development of the "Banias" low-power mobile processor.

**MARCH 2003** — Changes name of mobile processor architecture from Banias to Centrino.

**Q2 2003** — Expects to offer an 802.11a/b mini-PCI card on Centrino. Launches Centrino with an 802.11b mini-PCI card.

# Microsoft Steers Apps Toward Collaboration

BY MARC L. SONGINI

Microsoft Corp. this week will detail plans to push out technology designed to simplify software integration and to support increased collaboration capabilities for users of its business applications.

At its Convergence 2003 conference in Orlando, Microsoft will try to sell users on the idea that its applications can be used to integrate various business processes, said Lynne Stockstad, general manager of global solutions at Microsoft's business solutions unit. For example, companies could link their employees and business partners in automated workflows that support customer relationship management (CRM), supply chain operations and other activities, she said.

As part of the strategy, Microsoft will unveil integration and user-interface enhancements to simplify development of collaborative applications, Stockstad said. She was sketchy on the details but did say the plan includes adding an end-user portal or a similar role-based interface that will give workers a view of the business functions relevant to their jobs.

### Mixing It Up

Integration is a major issue for Tom Racca, vice president of sales and marketing at iQ NetSolutions Inc. in Westboro, Mass. IQ NetSolutions, which makes telecommunications equipment, runs Microsoft's Great Plains back-office applications and its new CRM software in a hosted installation.

Racca, who plans to attend the Convergence conference, said it's particularly important for him to see continued improvements in the integration between the Microsoft CRM and Great Plains applications. He said he also wants to combine the different functions of the applications into a portal-style user interface and open up the systems to his company's business partners.

The integration moves planned by Microsoft are key requirements for the midsize companies that the software vendor is targeting with its applications, said Katherine Jones, an analyst at Aberdeen Group Inc. in Boston.

Companies at that level often are plagued by continued reliance on repetitive manual processes that bog down productivity, such as having to copy customer information from one application to another, Jones said. Adding a portal isn't a unique step on Microsoft's part, but it could help end users do their jobs more efficiently, she said.

**APPLICATION-AWARE**

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**QuickLink k2000**
**www.computerworld.com**

# Microsoft to Change Server Software Pricing

## New model could mean significant cost savings for customers that use partitioning

BY JAMES NICCOLAI

Microsoft Corp. plans to adjust its per-processor licensing model to provide relief for customers that run its software on partitioned servers, a Microsoft executive said last week.

LICENSING

On April 1, the company will introduce per-processor licensing terms for eight server products to provide a fairer option for customers that use partitioning, said Rebecca LaBrunerie, head of Microsoft's licensing program. Under the new system, businesses will pay for only the processors that the software runs on, rather than for every processor in a partitioned server, she said.

The change could lead to significant cost savings for customers that use partitioning to segregate applications running on a single multiprocessor server, said Alvin Park, an analyst at Gartner Inc. in Stamford, Conn. Some of those customers have complained that Microsoft's current pricing system requires them to pay a license fee for each processor on their servers, even though the software may not actually be running on all of them, Park said.

Using partitioning to cut licensing costs can be complex from a technology standpoint, but the new model offers the potential for big savings for some customers, Park said. The issue mainly affects customers that consolidate single- or dual-processor servers onto larger systems as a way of cutting hardware and systems management costs, he said.

LaBrunerie said the new model will be "a lot more fair and logical" than the current system for customers that use partitioning. Server consolidation is a growing trend among businesses seeking ways to cut IT costs, and the new pricing seeks to address that, she said.

### More Flexibility

John Bielec, CIO at Drexel University in Philadelphia, said the new pricing structure will likely help the university cut costs as it continues to replace and consolidate servers.

The new pricing "will give us flexibility in terms of moving [Microsoft server applications] from smaller to larger servers and not getting hit with larger costs" for licensing, he said. Drexel uses two of the affected Microsoft server products, SQL Server 2000 and BizTalk Server 2002. Drexel replaces about one-third of its hardware annually, Bielec said, adding that he expects the savings from the new pricing structure to be reflected in his budget after July 1.

The model eventually will be extended to Microsoft's Windows 2000 server operating system, LaBrunerie said. The company recently acquired technology from Connectix Corp. in hopes of providing software that will let a single Windows server act as a series of separate machines. Microsoft will discuss pricing changes for Windows 2000 when that virtualization software is released, LaBrunerie said.

The new model will also apply to earlier versions of the eight Microsoft products affected by the change, although the company won't offer refunds to customers that have already paid for software they're running on partitioned servers. Those customers will be able to reuse licenses that are freed up by the new system, Microsoft said. For example, under the current model, a user running SQL Server on a partitioned eight-way server is paying for eight processor licenses, even though the software might be running on only four processors. When the new model kicks in on April 1, that customer will have four unused SQL Server licenses in hand, LaBrunerie said.

The changes apply only to customers on per-processor licenses and don't affect the client/server access license model, Park said. ◗

*Niccolai writes for the IDG News Service. Computerworld's Todd R. Weiss contributed to this report.*

**MICROSOFT PRICING**

The changes will affect

- SQL Server 2000
- BizTalk Server 2002
- Internet Security and Acceleration Server 2000
- Commerce Server 2002
- Content Management Server 2002
- Host Integration Server 2000
- Microsoft Operations Manager 2000
- Application Center 2000

# SAP Bundles R/3, Other Apps in New ERP Release

BY MARC L. SONGINI

SAP AG last week said it's rolling out a beefed-up version of its enterprise resource planning (ERP) software aimed at users who are daunted by the prospect of buying and installing a full set of the company's applications.

Announced at the CeBIT 2003 conference in Hanover, Germany, mySAP ERP is the newest release of SAP's flagship R/3 software. The product bundles R/3 with applications that were previously sold separately, including SAP's portal and business-to-business marketplace software.

Deborah Schmidt, global vice president of enterprise solutions at SAP, said mySAP ERP users will also get built-in functions from other applications, such as tools for analyzing human resources and financial data. SAP is exploiting the NetWeaver integration technology it announced in January to add functionality to the ERP software without requiring users to buy licenses for all the pieces of its mySAP suite, Schmidt said.

She added that there will be special pricing for mySAP ERP but didn't disclose details.

Tom Ackerman, senior director of business information systems at R/3 user Symbol Technologies Inc. in Holtsville, N.Y., said the plans outlined by SAP should provide increased integration capabilities and more user interface flexibility. Those are "two important elements which have been missing from traditional ERP offerings," he said.

MySAP ERP also includes support for automating back-office administrative services, such as management of real estate, travel expenses and payments of commissions and other incentives, said Jim Shepherd, an analyst at AMR Research Inc. in Boston.

The new release is available now. SAP also announced a professional services automation application designed to let companies in service industries automate the management of their operations.

SAP rival PeopleSoft Inc. also used the CeBIT show to announce an integration move, detailing plans to provide links to instant messaging and collaboration technology from IBM, Microsoft Corp. and Yahoo Inc. in its end-user portal and other applications.

Paola Lubet, vice president of marketing for PeopleSoft's AppConnect integration tools, said Version 8.8 of the company's Enterprise Portal software will also include new capabilities to help IT managers develop intranet sites for groups of end users who need to collaborate with one another.

The portal upgrade will be available this week, although the instant messaging connections aren't due until the fourth quarter, Lubet said. ◗

## Plattner Ends Management Role

SAP last week said Hasso Plattner, its co-CEO and chairman, will give up those jobs and step away from a full-time management role at the company he helped found in 1972. Plattner, who will become head of SAP's supervisory board, spoke with *Computerworld* after the announcement.

**Will SAP's strategic direction change when Henning Kagermann becomes the sole CEO?** I don't think so. I've worked with Henning for 21 years, and we set out the strategy over the last years together. I'll still play an active role in the form of giving advice.

PLATTNER

But all this time, this has been the way we've run the company – not by barking orders, but by convincing people to do things. Pretty much we've been a consensus-driven company.

**What has been your main contribution to SAP?** I like to play the creative role and took the liberty to live creatively and invent things and, with the help of colleagues, bring them into production and make money. Probably next to that, my best ability is to see early enough when something is reaching its peak and to start thinking about what is the next thing to do.

– *Marc L. Songini*

# BRIEFS

## Ore. Makes Push For Open Source

**Frustrated by budget woes and incompatible IT systems among state agencies, an Oregon legislator has introduced a bill that would require the agencies to consider open-source software when making IT purchases. The idea, said Democratic Rep. Phil Barnhart, is to offer cheaper and more flexible options to government departments. (See related story, page 46.)**

## IBM to Offer Digital Surveillance Help

**Looking to cash in on increased demand for video surveillance and other security-related services, IBM said last week that it will offer services to help companies deploy digital video surveillance and security systems. The new services are designed to help companies make a transition from older, videotape-based surveillance systems to IP-based surveillance networks.**

## Red Hat to Ship Midlevel Server OS

**Red Hat Inc. last week announced a midlevel server operating system in a bid to expand its sales beyond its high-end, enterprise-focused Advanced Server. The Red Hat Enterprise Linux ES product is designed for less heavy lifting than Advanced Server, which has been renamed Red Hat Enterprise Linux AS. The AS product runs on both 32- and 64-bit systems.**

## Short Takes

**INFINISWITCH CORP. and LANE15 SOFTWARE INC. said they're merging in order to bundle their InfiniBand products, a network switch and management software for high-performance server clusters. . . . A study from EVANS DATA CORP. found that 51% of companies in North America laid off software developers last year.**

MARK HALL ■ ON THE MARK

# Internet 2 Speed Tricks May Hobble SAN . . .

. . . operations in the data center, **if you don't take precautions,** warns Loki Jorgenson, director of research at jaalaM Technologies Inc., a network consultancy in Vancouver, British Columbia, involved in Internet 2 development. Jorgenson worries that the emergence of large packets (Jumbo Frame or MTU for maximum transmission unit) that have been used to set "land speed records" [QuickLink 35237] on Internet 2 and are available in Gigabit Ethernet are incompatible with the smaller byte-size packets in your run-of-the-mill Ethernet. He points out that there's "no Jumbo MTU standard for GigE," and vendors can set the packet sizes from 16,000 to 2,600 bytes, whereas 1,500 bytes is the set limit for 10MB and 100MB Ethernet. According to Jorgenson, if Gigabit Ethernet vendors "don't default to 1,500, **the data between devices might fall into black holes."** The most likely place for problems to occur, he predicts, is inside the data center, especially in a SAN, which is likely to employ the higher-speed network gear. During a restore of data, a SAN will likely need to transmit it to a server with lower-speed Ethernet. Jorgenson suggests that network admins **add MTU sizes to their checklist** of must-do tasks when installing Gigabit Ethernet systems, making certain that the network device with capacity for the smallest packet size is the largest MTU for your entire network. Although you won't be setting any land speed records, a slower speed is better than no speed at all. ■ **Tons of EAI tools are poised for spring** release. SeeBeyond Technology Corp. in Monrovia, Calif., on March 31 will ship eGate 5.0 as part of its Integrated Composite Application Network suite. All of the adapters have been rewritten in compliance with the Java Connection Architecture and run on SeeBeyond's own J2EE app server or WebLogic and WebSphere servers. By June, the company will be adding, among other parts of the suite, eVision Studio 5.0 for **Web and wireless application developers,** who get flashy GUI tools to help them link new apps to business logic and workflow rules. ■ Farther north in Pleasanton, Calif., Commerce One Inc. next Monday will ship its Composite Process Management Platform, Conductor 6.0. The EAI product includes a host of "process accelerators" — templates for a variety of vertical market business processes and workflow operations. Although Conductor 6.0 will be new, its **product heritage warrants the 6.0** convention, argues Narry Singh, chief marketing officer. As an aside, he says a recent company layoff puts the company back on solid ground **"with money in the bank."** A far better place to keep it than the CEO's mattress. ■ If you're one of those brave souls pushing ahead with Web services applications, you'll need a tool to identify, monitor and manage the interdependencies among those services. **Or you'll certainly need one when something goes wrong.** That's prompting Actional Corp. in Mountain View, Calif., to make available March 28 a slew of new products to keep an eye on proliferating Web services. Actional's Looking Glass server lets you set policies and receive usage statistics and service alerts through its Active Agents, which run on servers delivering Web services. James Phillips, Actional's senior vice president of marketing, claims that these agents consume only 10 msec of overhead for each transaction. But if you think that's **too steep of a performance price to pay,** you can use the new 4.0 version of the company's SOAPstation proxy server, which also ships March 28. It can implement the policies you set in Looking Glass and manage Web services traffic from a central server. ■ Thinking about outsourcing your Oracle database administrator's work? Well, you might have already come across Newton, Mass.-based Ntirety LLC. It has been remotely administering Oracle databases for about two years. Maybe Oracle isn't your problem. How about Unix? This week, Ntirety is announcing that it's ready to remotely run Unix systems. And by the end of 2003, claims company founder and CEO Mike Corey, he'll be set to remotely oversee Microsoft SQL Server. "In hindsight," he says, "I'd have started with SQL Server." Why? **"They are less sophisticated users, and there's more of them."** Advice to Mike: Stay away from Redmond for a while. ◗

### No Dead Zones

Wi-Fi users plagued with areas of interference and weak and overlapping coverage can be equipped to pinpoint them when Ekahau Inc. in Saratoga, Calif., ships its Ekahau Site Survey 1.0 monitoring tool on March 28. The software will work on a laptop and cost $895, or $1,545 if you want a GPS add-on.

# New CEO to Take Helm at Computerworld

BY DON TENNANT

International Data Group, Computerworld Inc.'s parent company, last week announced the appointment of Robert P. Carrigan as publisher, president and CEO of Computerworld. Effective April 7, Carrigan will be responsible for all business activities of the print publication, as well as online, events and research operations.

Carrigan, 37, is no stranger to Boston-based IDG, having held various executive positions at the company throughout the '90s, including four years as vice president and associate publisher of *PC World*. His move to Framingham, Mass.-based Computerworld will follow four years spent at America Online Inc., where he is senior vice president of interactive marketing.

At AOL, Carrigan led the Key Accounts Group, which manages Dulles, Va.-based AOL's largest and most strategic accounts.

CARRIGAN

Though his aim is to "create new and better ways to deliver information services to IT leaders," Carrigan said, readers shouldn't expect any drastic changes.

"What I can tell you is that we will continue to listen to the readers," he said.

"My sense is that given all of the awards and the accolades and the reach that has been determined by independent studies, *Computerworld* is in fantastic shape from an editorial perspective," he said.

Just last week, *Computerworld* received the Jesse H. Neal National Business Journalism Award in the "Best News Coverage" category for investigative reports last year on security problems associated with wireless LANs [QuickLink 26374]. *Computerworld* was also a finalist in the "Best Web Site" and "Best Staff-Written Editorial" categories. ◗

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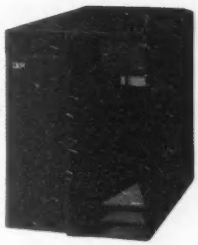

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# New IBM iSeries Pricing Won't Benefit All Users

## 'Sticker shock' could await small and midsize firms

BY JAIKUMAR VIJAYAN
INDIANAPOLIS

NOT ALL USERS of IBM's iSeries systems will benefit from the new software pricing and upgrade options the company announced in January, according to users at the Common trade show held here last week.

While the changes generally reduce complexity and increase cost-effectiveness, some small and midsize shops could face unexpected price increases as a result of the changes, users said.

"Overall, it's a very good effort," said Len R. Eckert, IT director at Jim's Formal Wear Co. in Trenton, Ill. "But there are some customers who will get hurt from it."

"It's fine for what we are doing, but I'm not sure it will work for everybody," added Michael Watson, e-commerce manager at Carhatt Inc., a clothing manufacturer in Dearborn, Mich.

Ian Jarman, an IBM pricing executive, last week acknowledged that some users could see price increases in moving to the new models. But he said the changes were made in response to long-standing demands by users for less-complex license structures.

### Impact Varies

The impact of the changes will vary depending on "where you were buying in the previous pricing range and where you will be buying in the new range," Jarman said. But for most users, he said, the move should be a positive one.

IBM in January announced a major pricing change along with several new iSeries hardware models — previously known as AS/400 systems — featuring a wide range of integrated middleware products [QuickLink 35717].

Users that upgrade their systems to the new models will have the option of choosing either a Standard Edition or an Enterprise Edition software package. The Standard Edition offers a bundled database, an on/off capacity-on-demand feature and partitioning capabilities. But users won't have the ability to run green-screen applications — or interactive workloads — on their iSeries systems.

Enterprise Edition users pay a higher upfront fee for a wider set of middleware products and the ability to use the entire capacity of their iSeries systems to run interactive workloads.

According to Jarman, the new pricing structure allows most users to get far more green-screen processing power for substantially less money than they would have paid under the previous license model. It also eliminates the performance caps and complexity associated with the previous multitiered pricing structure. But some users, particularly those with smaller workloads, will find little benefit, users said.

IBM'S iSERIES

**New License Model**

- Eliminates interactive features.
- Provides users one price for unrestricted green-screen use.
- Gives users one software tier.
- Offers on/off capacity-on-demand features.

Because of the way the pricing is structured now, a company with a relatively small 100-commercial-processor-workload interactive requirement, for instance, could be forced to sign up for the enterprise package on a higher-end box, even if the unlimited green-screen ability that comes with it isn't needed, Eckert said.

"It would be overkill for them," he said.

### 'State of Flux'

Only a "small subset of accounts" are likely to need the unrestricted green-screen use promised by the new pricing structure, said Jeffrey Corey, a regional sales manager at Computer Configuration Services, an IBM business partner in Indianapolis. Others are still in a "state of flux" over whether to go with the Standard Edition and Web-enable their green-screen applications, or to choose the Enterprise Edition when upgrading, he said.

"I've seen looks of sticker shock" over the price difference between the two pricing models, Corey said. In one test configuration for a customer, the difference between an enterprise software package and a standard one on the same piece of hardware was $102,000, he said.

Users who have already separately purchased much of the software that IBM is now bundling with the higher-end hardware models are likely to see less benefit as well, said Eric Songy, director of IS at Standard Companies Inc. in New Orleans.

As a result, they should get some credit for those investments, he said. Otherwise, "you are paying for a bundle without getting credit for what you have already paid for."

While acknowledging such issues, Jarman maintained that those users will still get additional benefits from some of the new performance tools and software that IBM is bundling with the new iSeries hardware.

# HP Rolls Out Usage Metering Product

BY JAIKUMAR VIJAYAN

A new automated metering technology announced by Hewlett-Packard Co. last week builds on the company's efforts to give users the ability to pay for hardware based on actual measured usage.

But companies will need to buy at least four of HP's high-end Superdome servers and commit to using at least 25% of the overall capacity on each to be eligible for the new metering product.

The metering capability will let users more closely align their hardware costs with actual system utilization, said Irv Rothman, CEO of HP's financial services organization, which will deliver the technology to users.

It will allow users to keep extra capacity available at hand but pay for the capacity only when it is actually used.

"It enables customers to lower their total cost of ownership and enhance their return on IT," Rothman claimed.

The metering system expands upon technology that HP has offered since the rollout of its first Superdome servers in late 2000. Earlier HP pay-per-use metering products kept track only of whether a CPU was on or off and provided a monthly usage average on that basis.

The latest version sits behind a company's firewall and determines how much of a CPU's power is being used every five minutes. A monthly average is calculated, and customers are billed based on average percentage of CPU power used.

All of the CPU utilization data is automatically collected, encrypted and transmitted to an HP billing engine without any user intervention or administrative overhead, according to Rothman.

**WHAT IT DOES:** Automatically captures CPU utilization rates.

**HOW IT WORKS:** The metering hardware and software sit inside a firewall and read CPU usage. The captured information is then transmitted to an HP billing system.

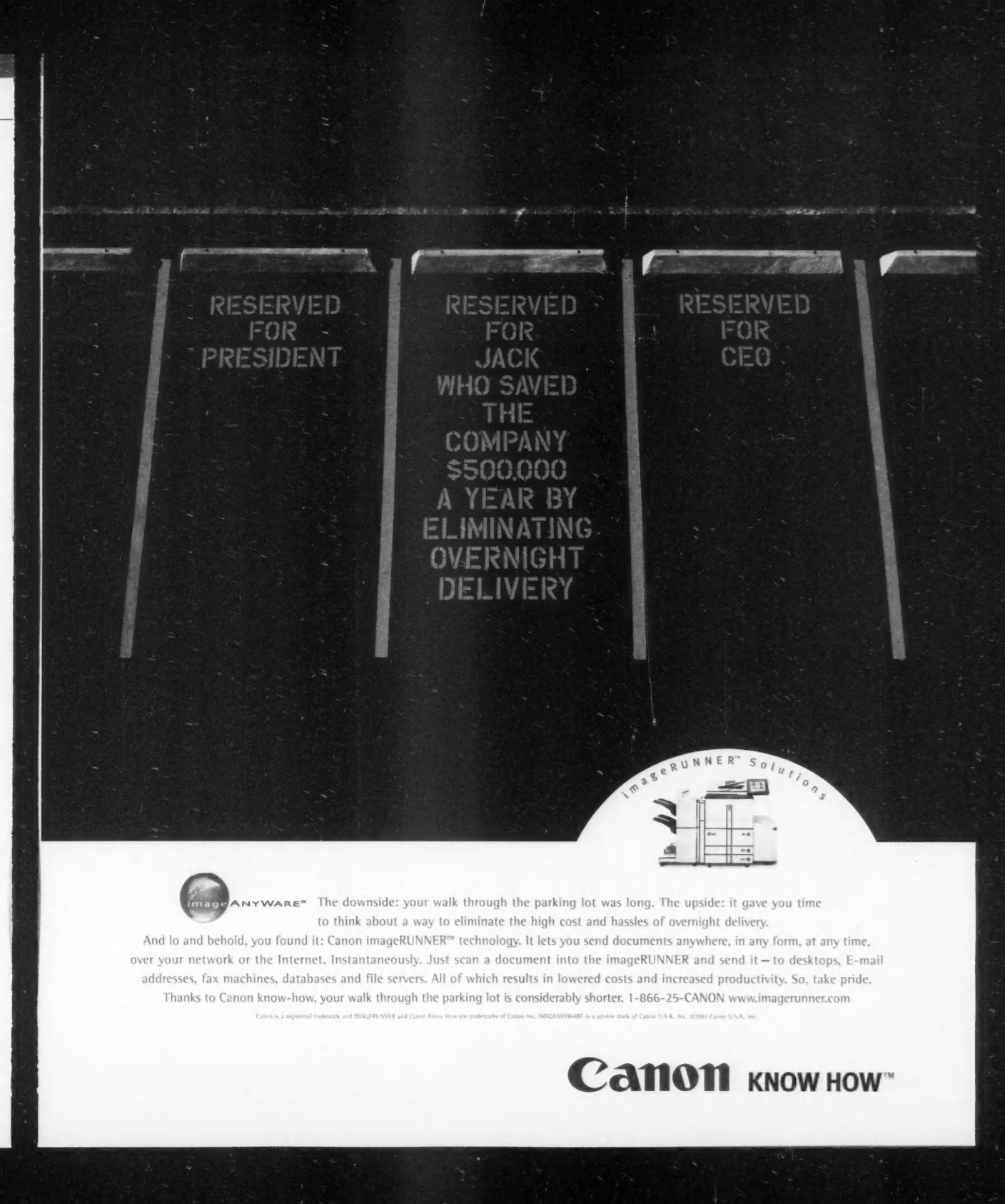
**WHY IT'S IMPORTANT:** It enables usage-based pricing.

**WHO'S ELIGIBLE:** Users who buy at least four new Superdome servers and commit to using at least 25% of the overall capacity on each system.

"If a user operates at maximum, this pay-per-use percentage utilization offering is no more expensive than a standard 36-month contract," Rothman said.

BMO Nesbitt Burns Inc., a financial services firm in Toronto, has signed up for the new model, according to Rothman. The company will save $3.3 million over three years compared with what it was paying under previous hardware leases, Rothman said. Officials at Nesbitt Burns were unavailable for comment by press time.

Users must be careful when signing up for such models, said Pat Cicala, president of Cicala & Associates LLC, a contract management consultancy in Hoboken, N.J. But companies that are well organized and know how to manage the peaks and valleys in demand can benefit from a pay-per-use model, Cicala said.

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# Brokerages Face Big IT Bills to Comply With USA Patriot Act

## Report puts total tab at $700M; many firms said not to have even started

BY LUCAS MEARIAN

A REPORT released last week estimates that the U.S. brokerage industry will spend as much as $700 million through 2005 on technology and outsourcing services in order to comply with the anti-terrorism and anti-money-laundering regulations of the USA Patriot Act.

The report by Needham, Mass.-based TowerGroup says brokerages spent $117 million on Patriot Act compliance measures last year and will invest about $404 million this year, when most of the Patriot Act's provisions become law. The report also indicates that some large brokerages expect to spend up to $30 million each. But after that, budgeting for compliance initiatives drops off sharply.

"I don't want to say they're not taking it seriously, but of 5,500 registered [securities] dealers in the country, I'd estimate that 1,000 or less are actively building or buying solutions," said Bob Iati, a research director at TowerGroup.

The Patriot Act, which was signed by President Bush in October 2001 in response to the Sept. 11 terrorist attacks, requires financial services companies to develop improved capabilities to identify customers and flag suspicious transactions.

### Where the Money Goes

According to TowerGroup, about 39% of compliance budgets is being spent on integrating back-end systems, and 35% is going toward new software. Another 24% of the money is being used to upgrade IT infrastructures, such as hardware and storage, the report says. The remaining 2% is paying for outsourcing services with operators of customer databases, such as Regulatory DataCorp International LLC (RDC) in New York.

RDC was launched in July by The Goldman Sachs Group Inc. and other firms to develop a database for screening suspected criminals. Companies use a secure Web portal to send individual names or lists of customers to RDC, which then runs the names through an Oracle database installed on Unix servers.

Bill Catucci, CEO and president of RDC, said the company has about 25 clients in addition to its 20 original investors, who included Merrill Lynch & Co. and Citigroup Inc. But he noted that the stipulations of the Patriot Act are fuzzy at best.

"When [federal regulators] say you should have a compliance system that meets due diligence, you don't know what that means," Catucci said. "The issue is that if you don't meet the requirements, they'll sanction you."

Regulators are first checking to make sure that companies have established the required anti-money-laundering and antiterrorism programs, and then they're examining the actual compliance procedures, said Breffni McGuire, a TowerGroup analyst. "And after that, they're looking to see if you have the technology in place and are using it effectively," McGuire said.

Eric Friedberg is a former federal regulator who is now executive vice president and general counsel at Stroz Friedberg LLC, an IT services and consulting firm in New York. Friedberg said that although most large banks and brokerages are on their way to Patriot Act compliance, many smaller companies don't intend to get there because they don't think it's worth the cost.

"I think the biggest roadblock is budgetary," he said. "The technologies exist to meet whatever high standard of due diligence the government requires. It's just that there has to be commitment by the organization to do it."

### Under the Patriot Act, Financial Firms Must

**SET UP** customer identification capabilities – so they know whom they're doing business with.

**INSTALL** a behavior-detection system that can flag suspicious transactions.

**CREATE** another system that can produce reports about suspicious activities involving various types of transactions.

# EMC Mixes Disk Drives On Its Midrange Arrays

## Bridging lets Clariion users add less-expensive ATA disk drives

BY LUCAS MEARIAN

EMC Corp. last week announced a bridging technology that lets its newest midrange storage arrays use lower-cost disk drives. The move is aimed at allowing IT managers to switch from tape-based data archiving to long-term disk storage.

EMC said its Clariion CX400 and CX600 arrays, which are resold by Dell Computer Corp., can be retrofitted with advanced technology attachment (ATA) disk drives alongside or in place of the Fibre Channel drives now used. Arrays with ATA drives for so-called near-line storage will be priced up to 50% below the cost of an all-Fibre Channel configuration, said EMC.

For example, a CX400 array with a 3.7TB storage capacity would cost $19.83 per gigabyte with Fibre Channel drives, compared with a price of $8.61 per gigabyte for an ATA-configured model, said the Hopkinton, Mass.-based company.

ATA drives are mainly used in PCs, but ATA-based disk arrays are an emerging technology for near-line information archiving and storage of fixed data, such as check images. EMC already sells an ATA-based array called Centera for long-term storage of fixed data, and vendors such as Network Appliance Inc. and Storage Technology Corp. also offer arrays with ATA drives.

### New From EMC

- EMC's **Clariion CX400 and CX600** arrays can now be equipped with ATA disk drives.
- **EMC Data Manager**, a data backup and restore tool, now supports backups to ATA disks on the Clariion devices.
- The company also announced **SAN Copy**, a software tool that moves data between Clariion and its high-end Symmetrix arrays.

Jerome Wendt, a senior information systems analyst in storage administration at payments processor First Data Corp. in Omaha, said EMC's entry into the near-line storage arena is piquing his interest in ATA drive technology.

"As I'm starting to look to stage storage in order to move it off to tape, having a name-brand vendor like EMC supporting this [technology] with their services definitely makes a difference," Wendt said. But he added that he's still not ready to move to an ATA-equipped Clariion.

### EMC's Clout

Mike Peterson, an analyst at Strategic Research Corp. in Santa Barbara, Calif., said EMC's offering isn't a technical breakthrough. But EMC's clout could help spur a movement away from tape archiving by users who want to keep their data online, said Peterson, who's also executive director of the Enhanced Backup Solutions Initiative, a trade group based in Carpinteria, Calif.

"The concept here is you will be storing information, and lots of copies of it, in multiple locations," he said. "But you have to automate the data protection process, and you can't do that with tape."

Because the Clariion arrays support both Fibre Channel and ATA, users can build hybrid storage servers that mirror or send snapshot copies of data between the two types of disk drives, said Chuck Hollis, vice president of platforms marketing at EMC.

EMC is using 250GB parallel ATA drives that run at 5,400 rpm, compared with top spindle speeds of up to 15,000 rpm on the Fibre Channel drives it offers with the Clariion arrays. The Fibre Channel drives top out at a capacity of 146GB, but they support nearly twice the I/O performance that the ATA devices provide, according to technical specifications.

The I/O differences leave Fibre Channel as the disk technology of choice for transaction processing and other high-performance applications that are run through the Clariion arrays, EMC said. But for longer-term storage, the ATA drives can back up data about 33% faster than tape archival systems, and they can restore that data five times faster than tape libraries can, the company added.

# 3Com Launches Devices for Sending Power via Networks

## New switch and IP phone supports draft Ethernet interoperability standard

BY MATT HAMBLEN

3Com Corp. last week announced a switch that provides electrical power over Ethernet wiring and interoperates with new IP telephones and wireless LAN access devices, freeing users of those products from the need to have separate power cables.

Networking devices that support Power Over Ethernet technology began appearing two years ago and are already being offered by 3Com, Cisco Systems Inc. and other vendors. But all the new 3Com products adhere to a draft interoperability standard called IEEE 802.3af, said Doug Hyde, a product manager at the Santa Clara, Calif.-based vendor.

Nick Lippis, an analyst at Lippis Consulting in Hingham, Mass., said 3Com's new switch and its companion devices are the first products to become available that adhere to the proposed 802.3af standard.

The chief benefit of Power Over Ethernet is that it eliminates the need to connect IP telephones and WLAN access points to power outlets, Lippis said. Companies that use the technology don't need to run power lines to the devices, resulting in fewer wires running over or under desks, he added.

3Com said its 24-port Power Over Ethernet switch, called the SuperStack 3 Switch 4400 PWR, forwards electrical power at low wattages to connected devices. The company plans to add new Power Over Ethernet phones in May and is already shipping a converter module that will let its existing IP telephones work with the new switch instead of requiring power adapters.

### Nothing to Unplug

Three new WLAN access devices can also be connected to the switch to get power so they can be placed on ceilings or other locations where power cables and outlets aren't readily available, Hyde said.

Ventura Unified School District in Ventura, Calif., earlier this month began beta-testing the 4400 PWR switch to provide power to some of the 1,200 3Com NBX IP phones it has installed at 22 sites.

Ted Malos, the district's director of technology, said Ethernet power is a "must-have" for the schools. If there's no need to use the power outlets in classrooms, there's no possibility that students will unplug the phones, he noted.

Malos said the school district plans to standardize its future switch purchases on the new 3Com devices, which will also be used to power a new wireless network that's due to be phased in this year. "The switch gives us incentive to go to wireless," he said.

Ethernet switching is a huge market, valued at $10.8 billion worldwide last year, according to Dell'Oro Group Inc. in Redwood City, Calif. But Power Over Ethernet sales are "still very small" and have yet to even be measured, said Julie Learmond-Criqui, a spokeswoman for Dell'Oro.

**TECHNOLOGY DETAILS**

### 3Com's Power Over Ethernet Devices

**SuperStack 3 Switch 4400 PWR:** Includes 24 ports; due to ship in April for **$2,495**

**NBX phones:** Enhanced IP telephones with 802.3af support; due in May for **$500 to $700**

**Converter module:** Lets older NBX phones work with the new switch; available now for **$30**

**Wireless LAN access points:** Three models; due this month and priced from **$749 to $1,099**

## Compuware Tools to Support ATM

Compuware Corp. today will announce that it's extending its network performance monitoring and analysis tools to support Asynchronous Transfer Mode (ATM) networks.

The ATM addition to Compuware's NetworkVantage product line includes software-based network probes, as well as a pair of network interface cards that transmit data gathered by the probes to a desktop management console.

Lloyd Bloom, a product manager at Compuware in Farmington Hills, Mich., said the company will also provide a growth management predictor for evaluating the need to expand ATM networks based on real-time and historical performance data.

Fonterra Co-operative Group, a Wellington, New Zealand, company that markets dairy products, plans to use the NetworkVantage tools to manage an ATM network that connects 125 sites in that country, said Stephen Revel, a wide-area network engineer at Fonterra. Revel wants to be able to identify the applications that are using the most bandwidth when network faults occur. "We didn't know before what sort of traffic could be causing downtime," he said.

– *Matt Hamblen*

# Gartner Survey Finds Continued CIO Focus on Cutting Costs

## But IT execs are also trying to aid innovation efforts

BY THOMAS HOFFMAN

Cost-cutting continues to be the top business issue facing CIOs. But IT leaders are also focusing on ensuring higher levels of information security, improving risk-management procedures and helping to foster more rapid business innovation, according to the results of a Gartner Inc. survey that's being released today.

Meanwhile, CIOs' top IT management priorities this year include providing better technology guidance to senior executives and demonstrating IT's business value (see box). Those findings also come from the Gartner survey, which was conducted online during last year's fourth quarter and drew responses from 620 CIOs and other IT executives worldwide.

The continued focus on reducing internal costs maps with what Bob Alsaker is seeing in his job as information systems director at American Fence Co., a Phoenix-based fence construction and rental firm. "We spent 2002 shoring up our infrastructure and reducing expenses wherever humanly possible," Alsaker said.

But Gartner said its survey, which was conducted by the consulting firm's Gartner Executive Programs unit, also reflected an increased focus on innovative uses of IT. Ellen Kitzis, group vice president of Gartner Executive Programs, said many CIOs have started looking "at the future of business as opposed to sustainability, stability and low cost."

On the other hand, Gartner said the survey results indicate that the long-standing goal among CIOs of creating a single view of their companies' customers is losing some steam. That is primarily the result of the emphasis on cutting costs and the disappointing results some users have experienced with customer relationship management projects, according to Gartner.

Alsaker said there "has been a slight increase in customer-focused initiatives" at American Fence. But because the company is still primarily a brick-and-mortar business, senior management tends to "shun any type of Web-based initiatives," he added.

One of the silver linings that of the survey revealed: The tenure of CIOs has risen from about 18 months at the time of Gartner's 2000 survey to nearly three years, said Kitzis. She added that CIOs "can't think about innovation" if they're worried about being on the job for only 18 months.

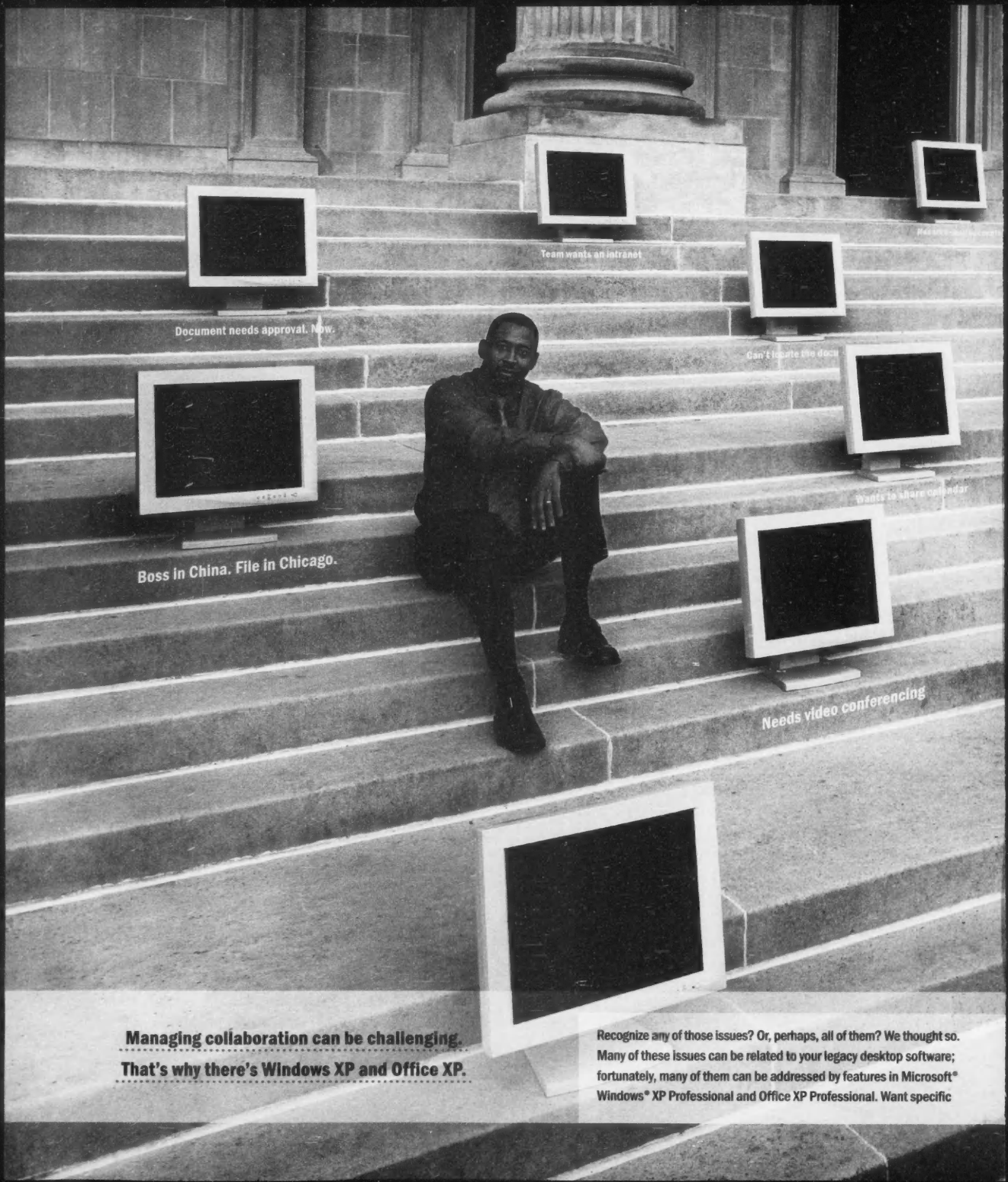
Michael Brenner, head of executive search firm Brenner Executive Resources Inc. in New York, attributed the rise in tenure partly to a desire to maintain corporate stability during the current poor market conditions. The increase could give CIOs the chance to have a more sustainable impact on companies, he added.

### Top IT Management Priorities for CIOs

1. Providing IT guidance to senior corporate executives
2. Demonstrating the business value of IT
3. Improving the internal governance of IT operations
4. Taking steps to reduce total IT costs
5. Developing or enhancing corporate IT architectures

Base: 620 CIOs and other IT executives worldwide, surveyed in the fourth quarter

SOURCE: GARTNER INC., STAMFORD, CONN.

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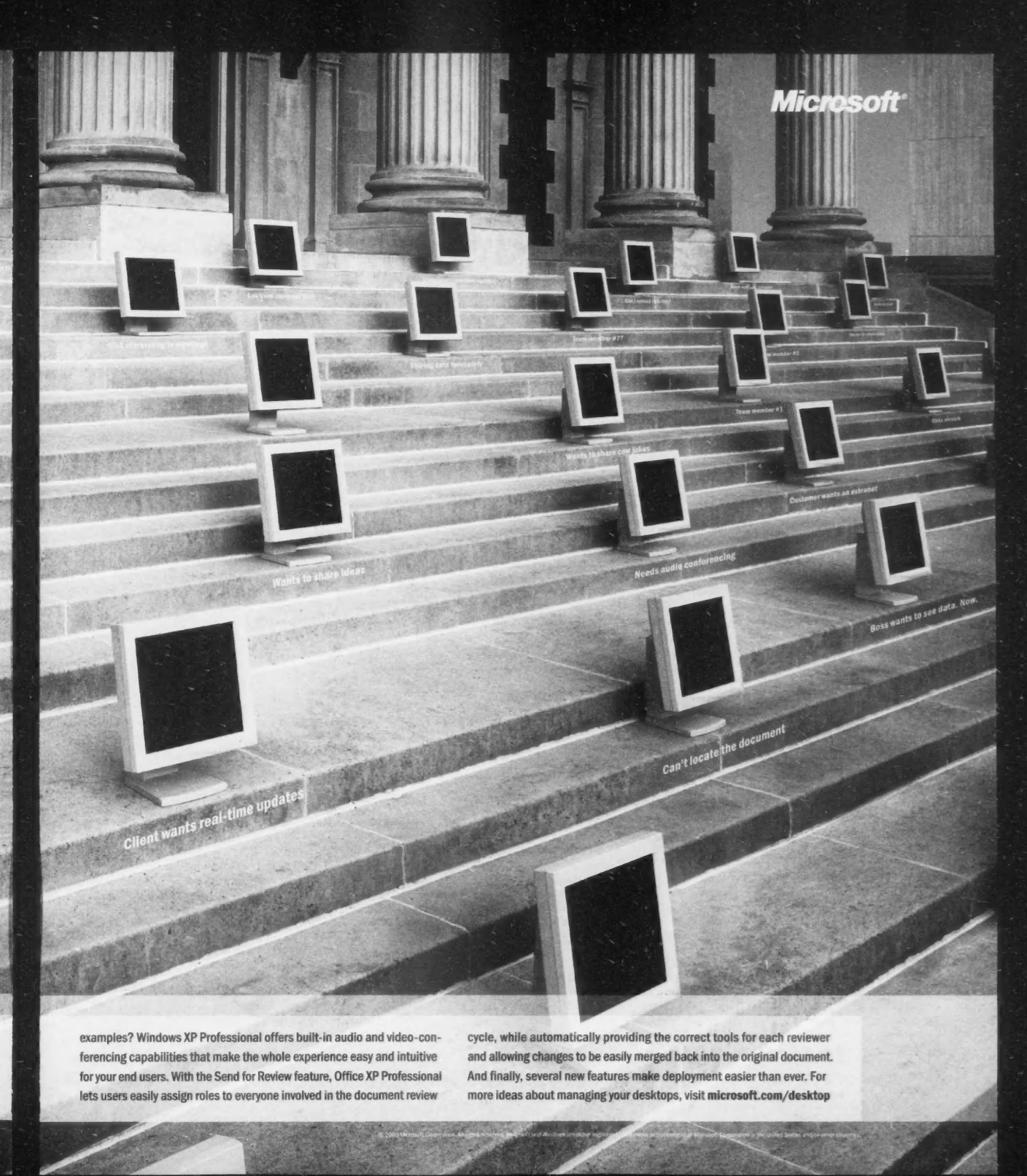


examples? Windows XP Professional offers built-in audio and video-conferencing capabilities that make the whole experience easy and intuitive for your end users. With the Send for Review feature, Office XP Professional lets users easily assign roles to everyone involved in the document review cycle, while automatically providing the correct tools for each reviewer and allowing changes to be easily merged back into the original document. And finally, several new features make deployment easier than ever. For more ideas about managing your desktops, visit **microsoft.com/desktop**

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## BRIEFS

### Messenger Adds Camera, Action

**Microsoft Corp. has added webcam functionality to its MSN Messenger 5.0 client, allowing users to stream and view live video via instant messages. The webcam features are being provided under an agreement Microsoft signed with Swiss firm Logitech International SA, which is providing the add-in application and maintaining the connection service.**

### Oracle Upgrades Warehouse Builder

**Oracle Corp. last week released Version 9.0.4 of its Oracle9i Warehouse Builder. Enhancements include a new SAP Integrator that makes it easier to extract information from SAP AG R/3 systems, better workflow features and support for industry standards to simplify the process of integrating Warehouse Builder with third-party products. Pricing is $5,000 per Named User Plus as part of the Oracle9i Developer Suite.**

### Cisco Aggregates SAN, LAN Traffic

**Cisco Systems Inc. last week announced enhancements to its ONS 15530 Multiservice Aggregation Platform, with the aim of combining storage-area network (SAN) traffic with services such as Gigabit Ethernet over a single fiber-optic link using dense wavelength division multiplexing.**

### Short Takes

**IBM and BELLSOUTH CORP. will jointly offer hosting and network services to firms in the southeastern U.S., particularly small and medium-size businesses. . . . Fashion retailer BENETTON GROUP SPA plans to attach radio frequency identification smart tags to its Sisley clothing line to help track shipping, inventory and sales in the Italian chain's 5,000 stores around the world.**

# Outdated Technology Hampers National Amber Alert System

## Pending bills don't include funding for revamp of network

BY PATRICK THIBODEAU
WASHINGTON

THE RESCUE last week of Elizabeth Smart, the Utah teenager who was kidnapped nine months ago, has brought renewed calls for a national Amber Alert system to help find missing children. But if Congress approves the plan, it will be implementing the system on top of a technology that isn't fail-safe or as effective as it could be, say critics.

The technology underlying the Amber Alert system is the Emergency Alert System (EAS), the direct descendant of the Emergency Broadcast System begun during the Cold War and known by its "This is only a test" warning message.

The bills before Congress to require Amber Alert to be adopted nationwide don't include funding for revamping the EAS. Amber Alert currently operates in 39 states, and some of them are still using a communications system that relies on radio relays between radio and television stations to disseminate emergency information.

"The EAS system doesn't reach enough people, particularly when you are talking about life-threatening issues like a terrorist attack or drifting gas leak," said Peter Ward, chairman of the Partnership for Public Warning, a McLean, Va.-based group formed last year that includes emergency preparedness experts.

Ward said there's a need to develop new systems for reaching the public that can link emergency messages to cell phones, pagers, personal digital assistants or any other communication device.

There are no standards for developing a ubiquitous warning system, nor is there much interest in Congress at this point, he said. President Bush in October proposed $10 million to beef up the Amber Alert program, and pending bills include funding. But most of the money will go to electronic highway signs and training, not to new technologies.

> **"The EAS system doesn't reach enough people, particularly when you are talking about life-threatening issues."**
>
> **PETER WARD,** CHAIRMAN, PARTNERSHIP FOR PUBLIC WARNING

The problem with transmitting emergency messages over the existing EAS is that "any one station along the way could have tripped it up if they didn't hear it, or messed up if their equipment was down," said Dale Gehman, vice president of technology at the Pennsylvania Association of Broadcasters in Harrisburg. "It was old-fashioned, Cold War era [technology]. . . . Even though it was EAS, it was still a daisy chain."

Two weeks ago, however, Pennsylvania officials tested the first phase of a new satellite communications system intended to link state emergency officials directly with broadcasters. This system has made a remarkable difference, said Gehman. Forty-four key stations responsible for relaying messages now have the satellite capability; in two years, about 320 broadcasters will have it, Gehman said.

The Amber Alert system was created in 1996 following the kidnapping and murder of 9-year-old Amber Hagerman in Arlington, Texas.

*Continued from page 1*

## Border Security

"That takes new systems, new infrastructure that are not even in existence today," Hutchinson said.

The need for a reliable and efficient system at the borders has been "made more urgent by the prospects of the United States going to war with Iraq and the possibility that Saddam Hussein might try to use weapons of mass destruction in America," said Stephen Flynn, a senior fellow in national security studies at the Council on Foreign Relations in New York.

The Department of Homeland Security's frontline troops at the borders and ports "are woefully understaffed, working with obsolete technologies, [have] inadequate support for training [and] are simply not up to the challenge," Flynn said.

Under law, the Department of Homeland Security has until the end of 2005 to complete the deployment of an integrated entry/exit system that makes maximum use of biometric technologies to identify foreign visitors to the U.S. and reduce the possibility of terrorists using forged documents to cross the borders.

So far, more than 6 million biometric border-crossing cards have been issued. And recent pilot programs using the cards on the Canadian border have uncovered more than 250 impostors, Hutchinson said. Additional biometric card readers are scheduled to be deployed by the end of the year, he said.

But the IT infrastructure challenges are formidable.

"Biometrics will be part of the entry/exit program, [but] we currently don't have the infrastructure in place to accommodate that," said Robert Mocny, director of the entry/exit program at the U.S. Bureau of Immigration and Customs Enforcement.

"The challenges for the land border are daunting," Mocny acknowledged. "Especially when you talk about the 50 largest land ports of entry. There are environmental laws [and other restrictions] that apply to the growth of infrastructure."

Mocny said $245 million given to the department for IT infrastructure improvements and a portion of the $362 million provided for the entry/exit system will go toward biometric infrastructure support.

**The U.S. Entry/Exit System Timeline**

| END OF 2003 | END OF 2004 | END OF 2005 |
|---|---|---|
| At all air and sea ports of entry. | At 50 high-traffic land-border points of entry. | At all remaining points of entry. |

But that may not come close to paying for a complete system, said Nancy Kingsbury, an analyst at the General Accounting Office, the investigative arm of Congress. In addition to card readers, the infrastructure would include computers and communications enhancements to handle more electronic processing.

"There are issues of scalability that will require considerable testing and development to bring the system to the point where hundreds of millions of identity checks annually are feasible, accurate and efficient," said Kingsbury.

There are also questions surrounding the technical and operational effectiveness of biometric technologies in projects as large as border control, she said.

"The costs and benefits of the system need to be assessed," Kingsbury said. "Suffice to say, we're talking billions of dollars just to implement biometrics."

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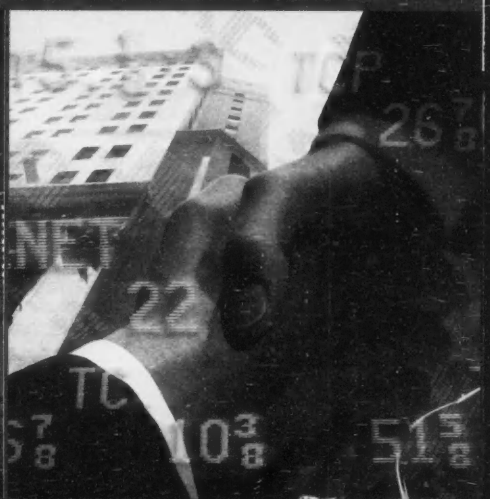

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# CA to Push Automated Fraud Detection

BY MARC L. SONGINI

Looking to capitalize on the need for financial companies to eliminate money laundering and fraud, Computer Associates International Inc. is rolling out a new management application.

The Islandia, N.Y.-based software company last week announced CleverPath for Global Compliance, which is targeted at the finance, banking and insurance industries. The package integrates several existing products to offer a greater degree of automation, including the CleverPath Aion business-rules engine and predictive analysis and portal applications, said Tina Wang, a CA vice president and product manager for CleverPath.

The global compliance application will require customization to match the specific needs of a given industry. CA has partnered with integrator BearingPoint Inc. in McLean, Va., to offer customization services to companies that don't have the personnel to tailor the software to meet their needs.

The software automates manual processes required by regulatory agencies and can help companies handle frequently changing reporting requirements, said CA.

The application can automatically detect fraud or other illegal activities based on built-in business rules and predictive analysis. Suspected fraud cases are identified and passed on to the appropriate personnel for action — potentially helping companies avoid fines, CA officials said.

## Customized Interfaces

A customized portal interface will present relevant data and business-intelligence tools to ensure regulatory compliance at companies, said CA. The application can also be used in the sales, marketing and customer service fields.

The customization services will clearly be necessary to make the new offering work, said Joshua Greenbaum, an analyst at Enterprise Applications Consulting in Daly City, Calif. Fraud detection is a broad field, and what may be standard practice in one industry could be a questionable practice in another, he said.

Greenbaum also noted that companies that have to comply with legislation such as the Sarbanes-Oxley Act may lack the internal processes and personnel to do so. That act criminalizes the destruction of documents that might be needed for federal investigations.

Available now, CleverPath for Global Compliance runs on Windows, Linux, Sun Solaris, HP-UX and IBM's AIX and z/OS. Pricing starts at $75,000.


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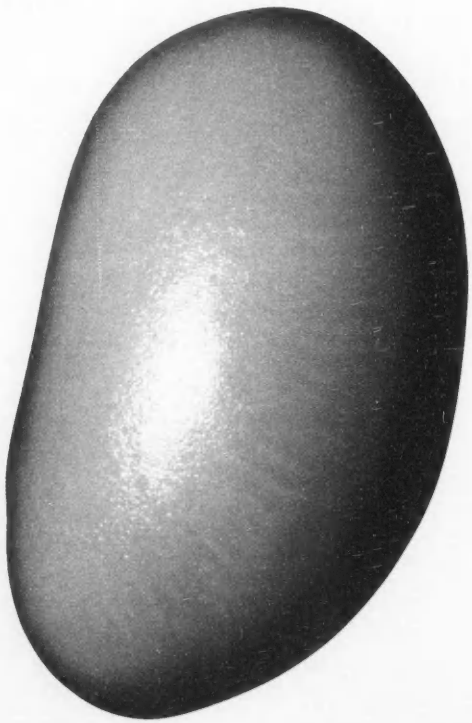

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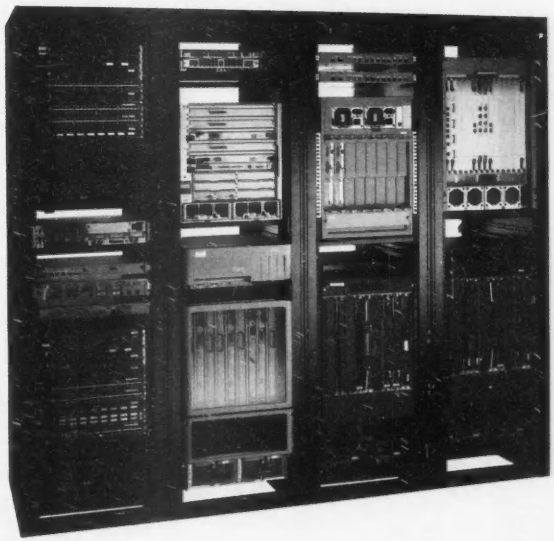

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# HP Enterprise Exec Discusses Postmerger Strategy

BY JAIKUMAR VIJAYAN

*As executive vice president of Hewlett-Packard Co.'s Enterprise Systems Group,* **Peter Blackmore** *is responsible for an $11.4 billion business. Blackmore spoke with* Computerworld *last week about how HP has fared since its merger with Compaq Computer Corp. last year.*

**Why is HP so bullish on Itanium when the rest of the industry seems to be taking more of a wait-and-see attitude?** Both premerger companies came to the same decision. Both had RISC architecture, and prior to the merger, both had decided to adopt Itanium. The logic was the same in both cases in that we wish to be in the computer business, not the chip business. We saw the advantage of using industry-standard chip sets and industry-standard building blocks with more of our R&D, then going into the value-add beyond that. The clustering, the partitioning, the software and the management tool sets are what offer genuine differentiation.

Come September or October, when we launch a complete Itanium product, there will be a paradigm shift. It will be a disruptive technology.

**At a time when other companies are ramping up their middleware investments, why has HP exited the middleware business?** Where we are investing the money is on management software and virtualization. Middleware is only part of that. What we've decided to do is have a very strong management software architecture. So we have OpenView as the core of the management software.

Above that, we have leadership concepts such as Utility Data Center, which is absolutely world class and is 18 months ahead of IBM and way ahead of anything Sun has to offer.

It enables virtualization and dynamic reconfiguration of all the systems in a data center or across multiple data centers. It is a very sophisticated approach to managing the infrastructure.

**What role do you see Linux playing in the enterprise?** We see Linux as being absolutely strategic. We see growth in all of the three standards — Windows, Linux and HP-UX, [which is] a standard by default because it has got 32% of the Unix market.

We actually have a $2 billion Linux business. We have the highest market share of any of the vendors in Linux on server platforms. It is 30%.

We have a big service practice around Linux: Around 5,000 of our services people are trained on supporting Linux.

**Where does OpenVMS fit in the overall scheme of things at HP these days?** It is already well on its way to being ported to IA-64. We will continue to support it on IA-64. It is a very special class of operating system. We are not planning to do anything else other than to continue supporting this environment, as well as the 450,000 users around the world that are on this.

So we are going to maintain it and make it run very well on Itanium. The same [is true] with the Non-Stop environment. It currently runs on the MIPS chip. It will be migrated to IA-64 as well. ◗

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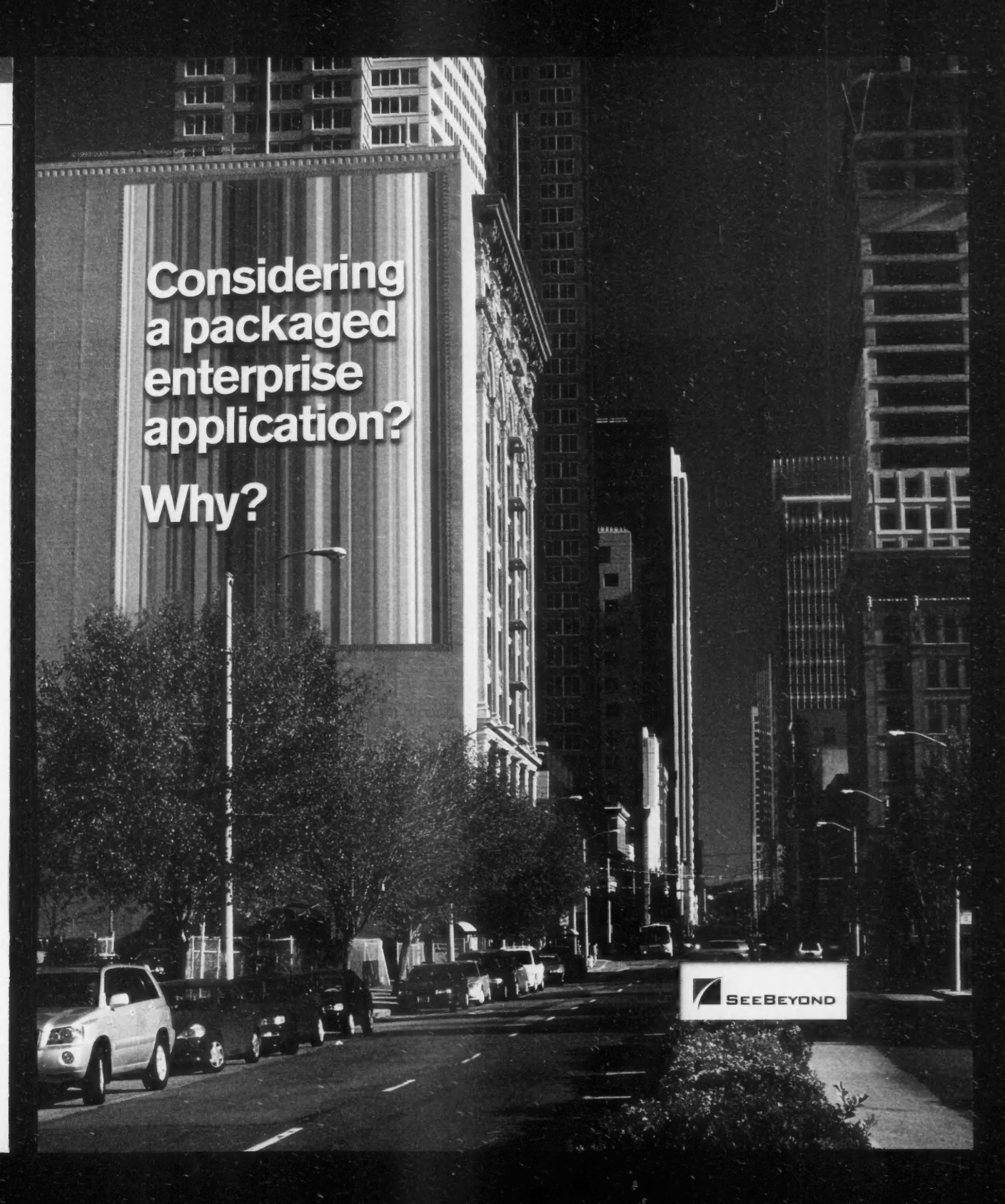
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MARYFRAN JOHNSON

# Spamming Tsunami

"STORY IDEA! Survey shows most needed appliance is refrigerator," chirped the subject line of one of my e-mail messages last week. It was one of the many hundreds of idiotic e-mails that clutter my inbox every week. Silly and unsolicited, but hardly real spam.

MARYFRAN JOHNSON is editor in chief of *Computerworld*. You can contact her at maryfran_johnson@computerworld.com.

The genuine garbage arrives in messages like this one: "Attention my friend, compliments of the season!" says a Mr. Abaku Kwame, who generously offers me a share in the millions of stolen funds from some country's royal family coffers.

Both of these messages slid right through *Computerworld*'s spam filtering service, which we outsource to Postini. I probably get one legitimate e-mail out of every dozen messages at this point, despite filtering efforts. To be fair, Postini does catch some 20,000 messages a week in its spam filters — a whopping 45% of all the e-mail *Computerworld* receives. That percentage unfortunately puts us on the far leading edge of the spamming tsunami, which is estimated to be 30% of all corporate e-mail today.

We can all recite the litany of complaints about unwelcome e-mail. It drains user productivity, wastes time on e-mail triage, overloads e-mail systems and servers, and drives up storage costs. It also gives the HR department heartburn, since sexually explicit e-mails could lead to hostile-workplace lawsuits.

But because there are so many other things to worry about in the world, I usually shrug off spam as the price we pay for the convenience of e-mail. It's the killer app with the killer annoyance, tagging alongside like an evil twin.

Yet the trend lines on spam as a corporate IT problem are rapidly heading in the wrong direction: up.

This year, spam is expected to cost U.S. businesses more than $10 billion in lost productivity and additional bandwidth, according to Ferris Research. And as wireless e-mail continues to catch on, the toll spam takes will spiral even higher.

"Bandwidth is virtually free on the Internet, but it's not free in wireless," points out Danny Shader, CEO of Good Technology, a mobile computing vendor. "That spam is costing real money, and somebody's going to be able to use that economic loss to seriously nail one of the spammers."

Enter the legislators and the lawyers. As we reported last week ["States Rush to Pass Laws to Fight Spam," QuickLink 36874], all 50 states could have antispam laws on the books by the end of this year. Half of them already do. But these new laws, while gratifying to the legions of spam-haters, are largely useless for actually stopping the stuff.

For corporate IT, there are some hopeful developments on the horizon, but few products that scale to data center heights.

Both Microsoft and America Online are openly at war with spammers, with AOL reporting last week that its new antispam feature is blocking as many as 1 billion e-mails *per day*. Serious attention is also being paid to the problem by the influential (albeit slow-moving) Internet Engineering Task Force standards body, which this week in San Francisco will be investigating prevention strategies in its newly created antispam research group.

In the meantime, industrial-strength antispam software for enterprises is notably lacking, says Internet pioneer Eric Hahn, now a partner in Inventures Group, an investment firm for technology startups. "There are interesting things being done for consumers and ISPs, but in the corporate market, the number of offerings are few and far between," he contends. "The vendor community is just now responding."

With the high tide of spam continuing to surge, the first vendor that delivers a truly effective spam blocker for the data center will save many a drowning CIO while making a boatload of money to boot.

PIMM FOX

# Middleware With a Twist

AS THE NEED to access information grows, the importance of reaching the brass ring of integration throughout the organization rises. That's why you're going to hear more and more about the move away from a single database or database management product to something virtual that can integrate information internally as well as across suppliers and customers. Something like middleware. But with a twist.

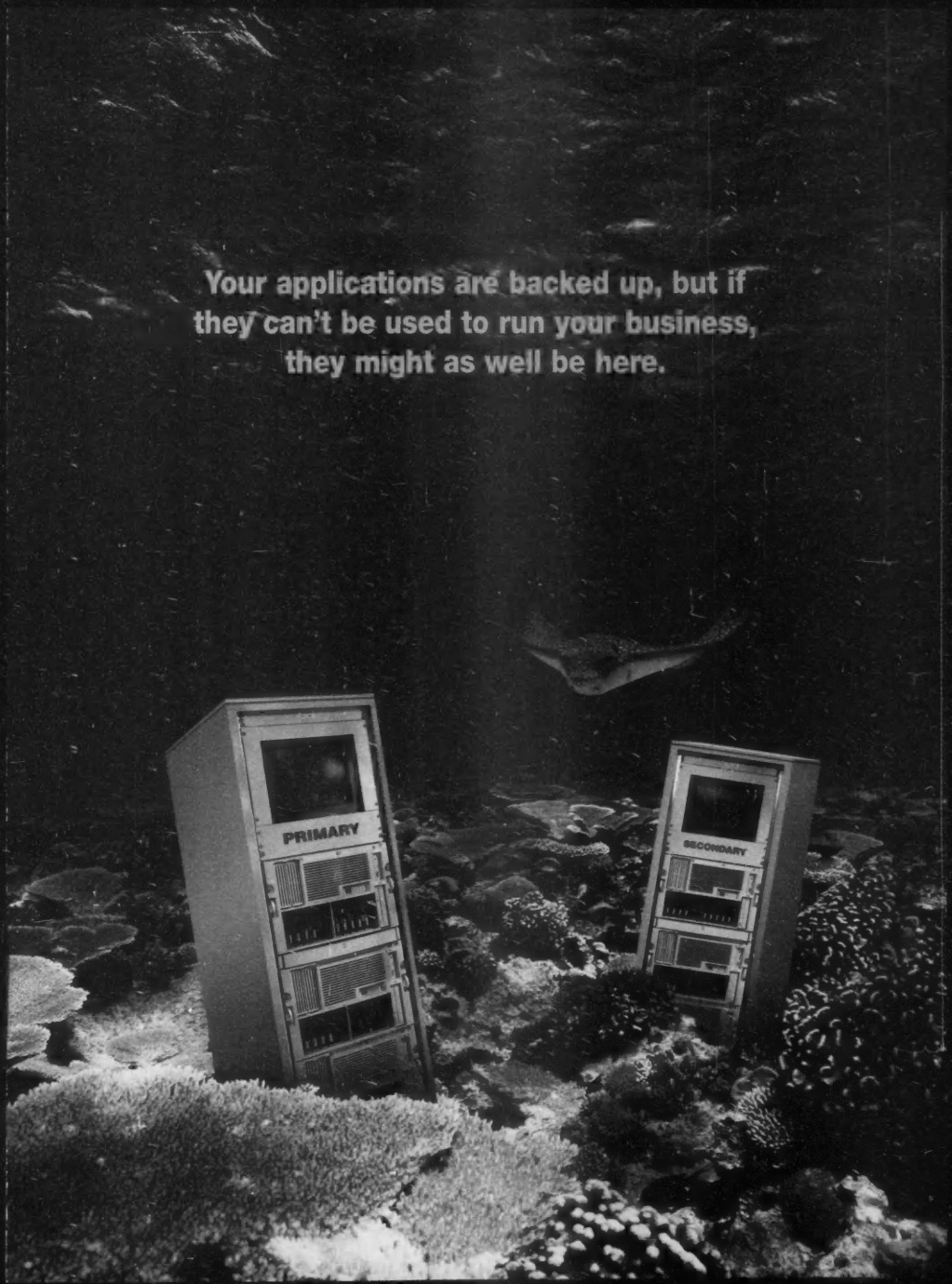
It's called federated development, and it's defined as the ability to have an integrated view of all pertinent information without keeping the data in one central location. Getting that federated view isn't going to be easy.

Rather than writing code, this new federated method relies on gluing code together using open standards that are defined for different platforms. This approach requires an information integrator — like a software plug-in — that can learn the best way to answer a query and that can be reused. In essence, these integrators build a virtual database.

PIMM FOX is a freelance writer in San Francisco. Contact him at pimm_fox@pacbell.net.

It certainly makes sense, given the myriad platforms that organizations have deployed and the various geographical locations IT operations have come to support. But how practical is this sort of integration effort, given the ongoing need for service, maintenance and enhancements? At the Indiana University School of Medicine, for example, about 100GB of biomedical information is produced every day — and it needs to be available at multiple sites in various forms, depending on the systems users have access to. Corporate CRM solutions present similar data management challenges, with call center support, customer transactions, e-mails, scanned documents and real-time information all needing to be woven together. How can a federated approach, which builds its virtual database over time, assist in these cases?

The scope of these problems may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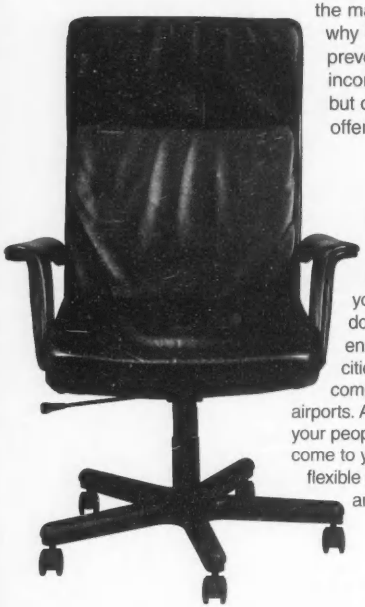

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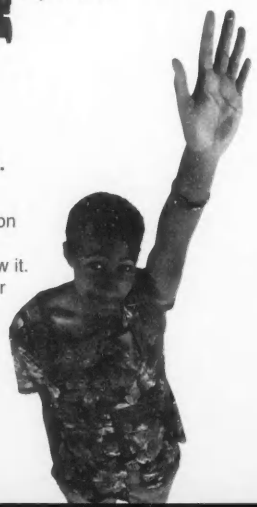

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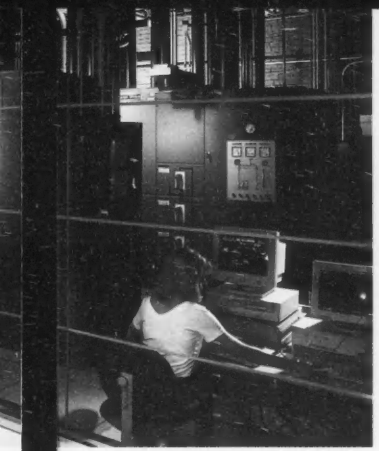

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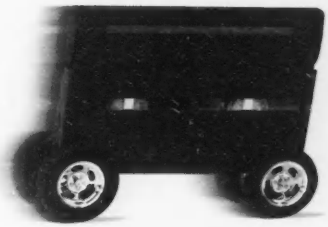

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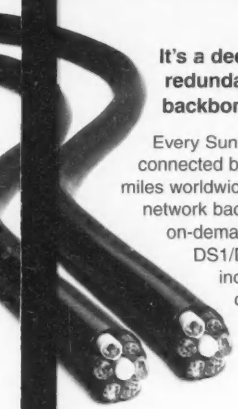

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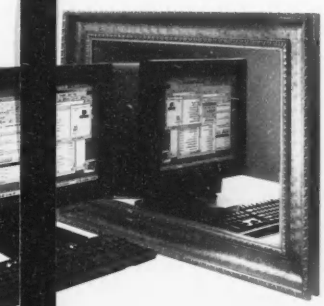

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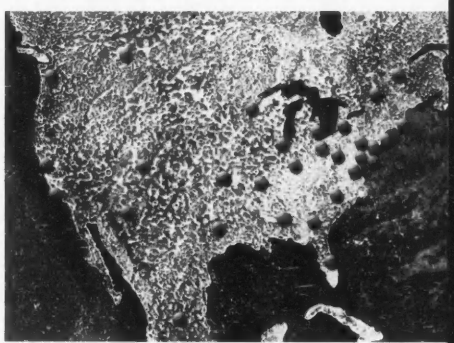

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*Source: Dunn & Bradstreet's MDDI

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seem to overwhelm the advent of data federation, just as it did for the promise of middleware without the twist. But it may be the only reasonable approach to integrate complex environments without abandoning long-standing IT infrastructures.

Nelson Mattos, director of integration information at IBM's Silicon Valley Laboratory, says, "As change happens in the marketplace, you have to be able to move pieces of data around quickly in a way that doesn't require you to redo your entire system."

Sure, it would be great to always have a central data repository and a clean access environment. But that's not practical for most companies because of mergers, new suppliers, legacy systems and a host of other reasons. And even if it seems practical, the money to build a central repository isn't in the offing. So a federated approach could be the answer. ◗

DAVID MOSCHELLA

# Lessons From A London Traffic Project

ANYONE WHO HAS ever tried to drive across London knows that its traffic is among the world's worst. That great city just wasn't built for cars. Most streets are too narrow, and even the wide ones get bogged down by countless traffic lights, roundabouts, bus lanes and seemingly endless construction and repairs. The slightest accident, breakdown or, heaven forbid, snow can reduce large sections of the city to hopeless gridlock.

Happily, it now appears that IT can help. On Feb. 17, London switched on its controversial system for charging for congestion, whereby from 7:00 a.m. to 6:30 p.m. on weekdays, anyone driving into a roughly 8-square-mile zone of central London is charged £5 (about $8). Despite many dire warnings, the system has mostly performed as promised. Better still, the volume of cars in the central city has noticeably declined. Thus far at least, the strongest proponent of congestion charging, London Mayor Ken Livingstone, is all smiles.

Here's how it works. According to the Capita Group, the project's lead contractor, there are 174 entry and exit points to the charging zone, each of which is monitored by banks of analog cameras. Some of them capture license plate numbers. Each captured number is sent to a central database that checks whether the owner of that car has paid the required fees or has one of several exemptions. Those who haven't are fined.

DAVID MOSCHELLA'S latest book is *Customer-Driven IT: How Users Are Shaping Technology Industry Growth (www.customer-driven-it.com)*. Contact him at dmoschella@earthlink.net.

The philosophy behind congestion charges appears to transcend political ideology. Livingstone is often affectionately referred to here as "Red Ken," because of his generally far-left — though jovial — views. However, the idea of using pricing mechanisms to reduce excessive traffic has been championed by Milton Friedman since the 1950s, and the only other major city to adopt this type of approach is Singapore, hardly a favorite of the left.

For IT vendors, traffic management systems are a potentially large new public-sector opportunity (something that is clearly needed right now). Consider that the current system covers less than 2% of Greater London and, more important, that hundreds of cities around the world are closely monitoring this initiative. If London's success continues, other cities will surely follow.

But for IT users, the main message is one of leadership. Congestion charges are a good example of a system that can't be done incrementally, can't be easily prototyped and has to work effectively from Day 1. Someone had to make the large upfront capital investment and accept the associated risk. In London's hypercritical political culture, this wasn't easy. The left has attacked the plan as both unfair to the poor and worrisomely Orwellian, the right as just another tax increase. Both sides doubted that such a complex, quasi-governmental system would ever really work.

Whether or not you support congestion charges, London's example shows how IT industry leadership is moving away from suppliers and toward customers, who must provide the leadership, risk-taking and perseverance that IT progress has always required (this is the main theme of my recent book). In this sense, congestion charges are just one example of the many important new systems that IT is capable of supporting. Fortunately, the mayor of London has provided the necessary leadership, much to the benefit of the entire high-tech community. ◗

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# READERS' LETTERS

## A Strict Focus on ROI Can Be Limiting

**WITH REGARD TO** the special report on ROI in the Feb. 17 issue [QuickLink k2340], CIOs and IT managers may be limiting their results by becoming too focused on ROI. While measuring return on any software project is important, it shouldn't be the key determinant of success. As your writers pointed out, the associated soft benefits, such as improving customer relationships, are difficult to measure. But, in actuality, it is the soft benefits, not the ROI, that can disrupt markets and create true competitive advantage and business value.

Technology innovation that creates true, sustainable business value doesn't always fit into a neat measurement tool. The focus on ROI is a good starting point, but focusing strictly on project numbers vs. business results can be dangerous. Without taking a holistic view of the organization, inefficiencies can be displaced from one department to another. While the ROI numbers may look good, the bottom-line business benefits may be lacking.

Instead, companies should focus on delivering sustainable business value and pay close attention to leveraging people and processes as well as technology. It is this combination that can create competitive advantage. In the end, true business value and increased competitive advantage will help a company succeed, and that success is more important than generating positive ROI numbers.

**Mary Haigis**
*Managing partner, Clarkston Consulting, Durham, N.C., mhaigis@clarkstonconsulting.com*

## The Myth of ROI

**HOW ABOUT** "The Last Chapter: ROI" instead of "The Next Chapter: ROI" [QuickLink 35584]?

In his book *The Information Paradox* (McGraw-Hill, 1999), John Thorp pointed out the myth of ROI. Thorp makes the distinction between IT projects and business-change programs. IT doesn't generate value; it generates costs. Technology is an expense. For that expense, you can get a capability, nothing more. For the organization to get value – to generate a return on investment – another key thing has to happen. Someone has to use this capability. Most often, that requires a change in processes or behavior and a harvesting of those benefits. Then the organization gets value.

Increasingly, what Thorp and his group called the "information paradox" – the reason we don't get value from IT – is not a result of failing to build the capability. We are getting better and better at building technical solutions. It is instead a result of failing to make the necessary changes in people, processes and organizations.

**James Morrison**
*Sandringham, Victoria, Australia*

## Calculating True ROI, Associated Risks

**DESPITE WHAT IS SAID** in the article "Tough Task: Why ROI Is Important" [QuickLink 35951], IT's impact on an organization is quantifiable and measurable. Erik Brynjolfsson's statement that "up to 90% of the costs and benefits of IT investments are in intangibles" is just plain wrong. IT investments, in general, are some of the riskiest investments a company will make. The risk comes from the underlying uncertainties that are inherent to the cost and benefit variables that make up the IT investment. Very few methods have been successful in correctly calculating the true ROI along with its associated risks. An exception is the Applied Information Economics (AIE) methodology utilized by Information Economics Inc. As part of the AIE methodology, we use a technique called the clarification chain: If it is better, it is different in some relevant way; if it is different in some relevant way, it is observable; if it is observable, it is observable in some amount; if it is observable in some amount, it can be measured. The main reason IT analysis refers to intangibles is that most people aren't properly trained to clarify what a decision variable means. Everything that is real for an IT investment is measurable.

**David Gronski**
*Executive vice president, Information Economics, Chicago, dgronski@infoeconomics.biz*

**COMPUTERWORLD** welcomes comments from its readers. Letters will be edited for brevity and clarity. They should be addressed to Jamie Eckle, letters editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax: (508) 879-4843. E-mail: letters@computerworld.com. Include an address and phone number for immediate verification.

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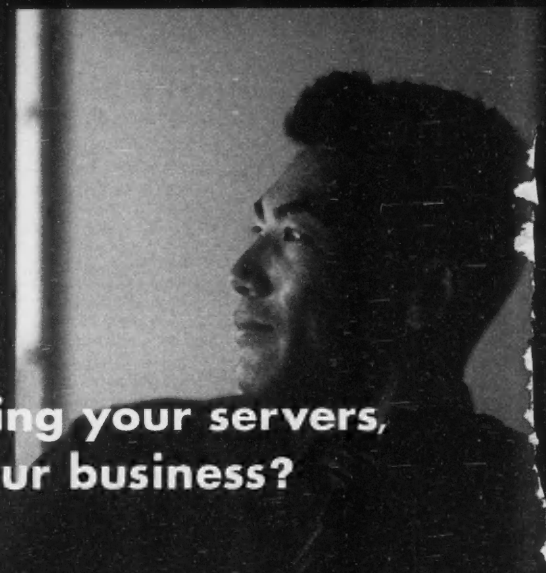

# If you're busy monitoring your servers, who's watching your business?

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# KNOWLEDGE CENTER OPERATING SYSTEMS

03.17.03

**Getting Started With Linux**
Many IT shops are just starting to explore the Linux phenomenon. Here's some advice from veterans such as Dan Agronow (right), vice president of technology at The Weather Channel, on issues such as version control, backup, fail-over and support. **Page 40**

**The Worldwide Code Rebellion**
More and more foreign governments are encouraging the use of open-source software by government IT managers. It's a powerful movement that has many roots, including anger over licensing terms set by U.S. vendors, the leeriness of being locked into proprietary formats and a desire to build homegrown expertise. **Page 46**

## EDITOR'S NOTE

THE TRADE PRESS is very, very good at reporting what the leading-edge users are doing. When Unilever said it would move to Linux in a big way, for example, *Computerworld* reporter Todd R. Weiss was all over it [QuickLink 35861]. And rightly so.

But my hunch is that for every Unilever, there are thousands of IT operations that haven't dipped their toes in the Linux waters and might even be a little scared to do so. Or maybe their Linux use is limited to a few servers and they're wondering how to dive in and swim with the penguins.

Similarly, the trade press is very good at covering the companies that move to IBM's latest z/OS operating system or Microsoft's newest version of Windows Server. But what about the rest — the folks sticking with older OS versions, often for mighty good reasons? If the leading-edge IT users are comparable to the cultural trendsetters in California or Paris, what about Peoria?

In terms of sheer numbers, about 80% of the mainframes out there are running IBM's older OS/390 operating system. And Microsoft itself estimates that up to 40% of the installed base for the Windows Server OS is using the older Windows NT Server 4.0. (Why? Because it's reliable, and it's hard to cost-justify a disruptive upgrade.)

That's why this special report has stories for Linux newcomers and OS/390 users under pressure to migrate to z/OS, and about users still on Windows NT. It's devoted to the hordes on the lagging edge.

Hello, Peoria!

*Mitch Betts is director of* Computerworld's *Knowledge Centers. He can be contacted at mitch_betts@computerworld. com.*

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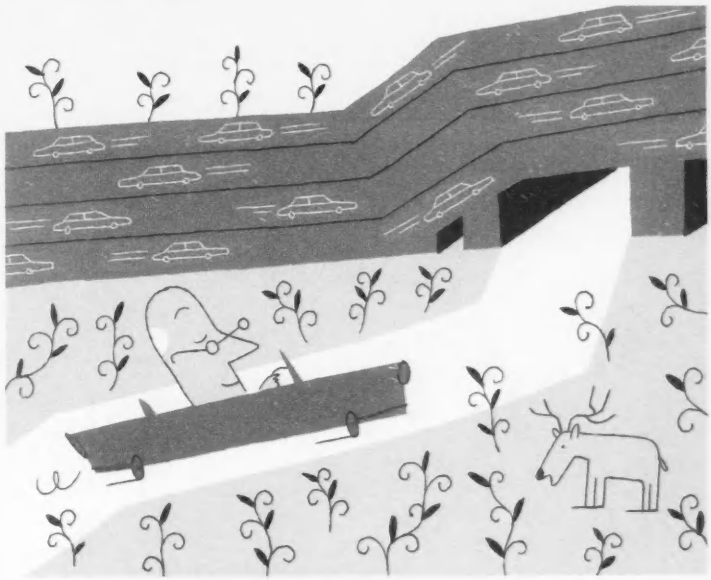

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# In the Slow Lane

**SPECIAL REPORT** Legions of laggards aren't jumping on the latest OS bandwagons.

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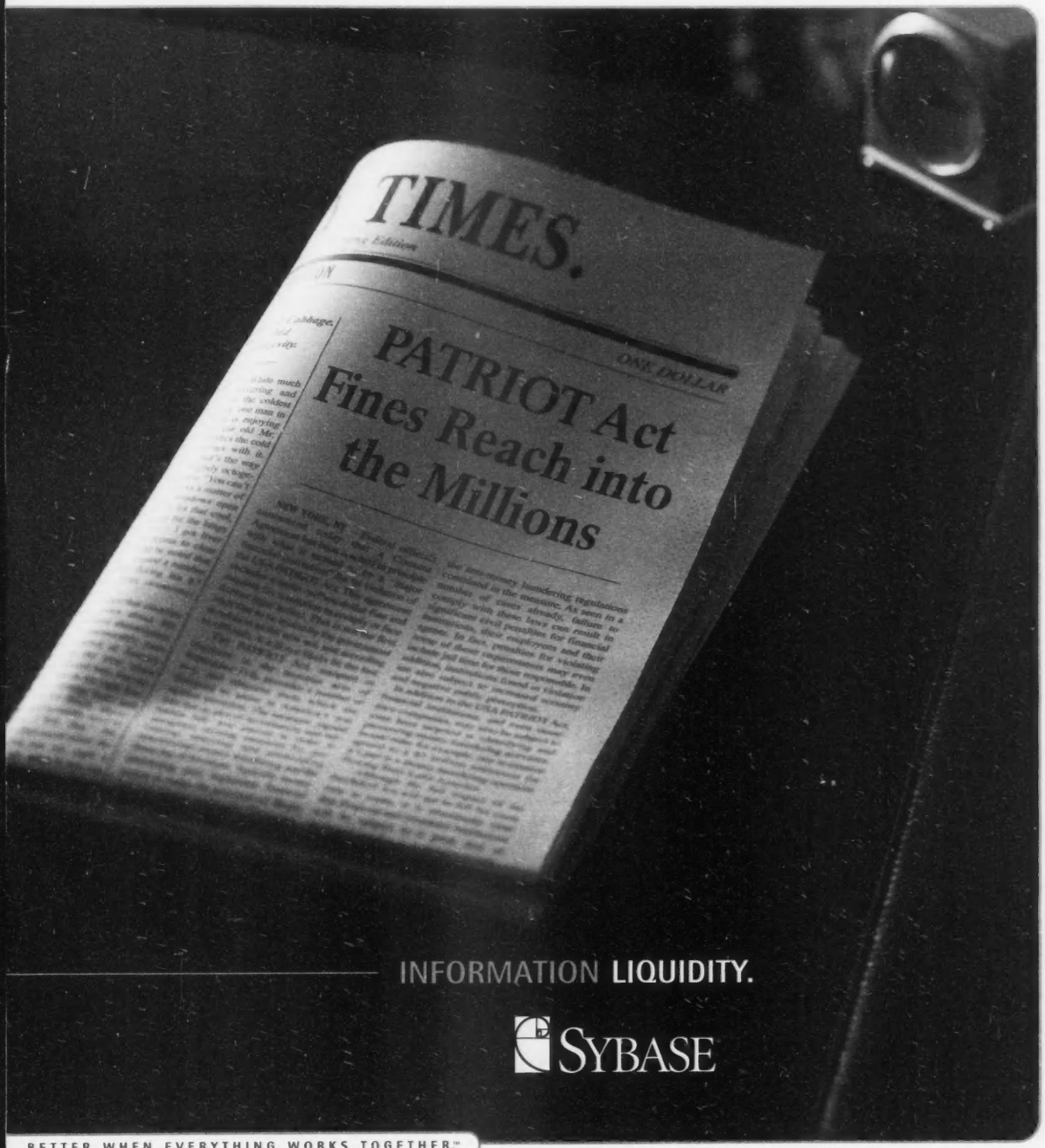


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# The Story So Far

## Bell Labs, GM and MIT played major roles in the development of operating systems. By Frank Hayes

IN THE EARLY DAYS of computers, the operating system — the software that manages applications and system resources — didn't exist. That's because software itself didn't exist. Computers were programmed by manually wiring calculating circuits together, then physically changing the wiring for every new calculation to be performed.

That began to change in 1945, when John von Neumann described a computer that could store instructions in memory that would tell the computer's calculating units what to do. On June 21, 1948, the first computer program ran on an experimental machine called Baby at the University of Manchester in England — and software was born.

But computers still ran only one program at a time. Operators still had to load each program and its data into memory from tape or punched cards, run the program and then repeat the whole process for the next program. It was faster than changing the wiring, but it still wasted plenty of very expensive computer time.

By the early 1950s, businesses using computers were looking for ways to solve that problem. In 1955, programmers at the General Motors Research Center came up with a solution for their IBM 701 computer: a batch-processing monitor program that let operators put a series of jobs on a single input tape. It was the first step toward a full-scale operating system.

Computer vendors soon offered their own batch monitors. In the early 1960s, they began to add what would become critical operating system features. The Burroughs 5000 Master Control Program offered virtual memory and the ability to run several processes at once. Univac's EXEC I allocated memory, scheduled CPU time and handled I/O requests. IBM's OS/360 allowed the same software to run on a variety of machines.

In 1963, a team at MIT led by Fernando Corbato developed the Compatible Time Sharing System (CTSS), the first practical OS that let several users at once run programs from terminals. Much of that team soon went to work on a far more ambitious OS: Multics, a joint project with General Electric Co. and AT&T Bell Laboratories that would offer a tree-structured file system, a layered structure and many other modern OS features.

AT&T pulled out of the Multics project in 1969. But AT&T programmers Ken Thompson and Dennis Ritchie began to develop their own scaled-down version of Multics, which they punningly called Unix. Unix was easy to port to new computer architectures and grew popular at universities because AT&T made the Unix source code available for students to study. By the 1980s, Unix had spawned a generation of workstations — and displaced many existing operating systems.

Meanwhile, the first desktop computers arrived in the mid-1970s with OSs that were little more than the monitors of 20 years earlier. When IBM began selling PCs in 1981, it offered several OSs — but the least expensive and most popular was PC DOS, provided by a small company named Microsoft Corp.

Microsoft soon dominated PC operating systems, steadily borrowing features from its competitors, such as the Windows graphical user interface cribbed from Apple Computer Inc.'s Macintosh. Microsoft also offered Xenix, the most popular PC version of Unix, and worked with IBM to develop a multitasking PC system, OS/2, in 1987. But three years later, the IBM/Microsoft partnership fell apart, and Microsoft merged its OS/2 work with its popular Windows to create Windows NT in 1993.

Finnish student Linus Torvalds wasn't trying to compete with Microsoft in 1991 when he began work on a Unix clone he called Linux. After finishing a first version, Torvalds asked for help from other programmers on the Internet. By 1994, Linux was a full-scale, free operating system. By 1999, it ran on more Internet Web servers than Microsoft OSs — and was Microsoft's most significant competition.

Today, Linux runs on everything from handhelds to mainframes, while versions of Windows span nearly the same range. How competition — and interoperability — between Windows and Linux develops may shape the future of enterprise computing.

And now, on with the story . . .

THE ASSOCIATED PRESS

Linus Torvalds

**1945:** John von Neumann first describes a computer with stored programs.

**1948:** Baby, at the University of Manchester in England, runs the first software program.

**1955:** General Motors Research Center develops first batch-processing monitor.

**1963:** Fernando Corbato leads MIT's development of CTSS, the first practical time-sharing system.

**1965:** MIT, General Electric and AT&T Bell Labs begin developing Multics.

**1969:** Bell Labs programmers **Ken Thompson** (left) and **Dennis Ritchie** begin work on Unix.

**1976:** Digital Research releases CP/M, first widely used operating system for desktop computers.

**1981: IBM PC** debuts with PC DOS operating system provided by Microsoft.

**1985:** Microsoft rolls out Windows user interface for DOS.

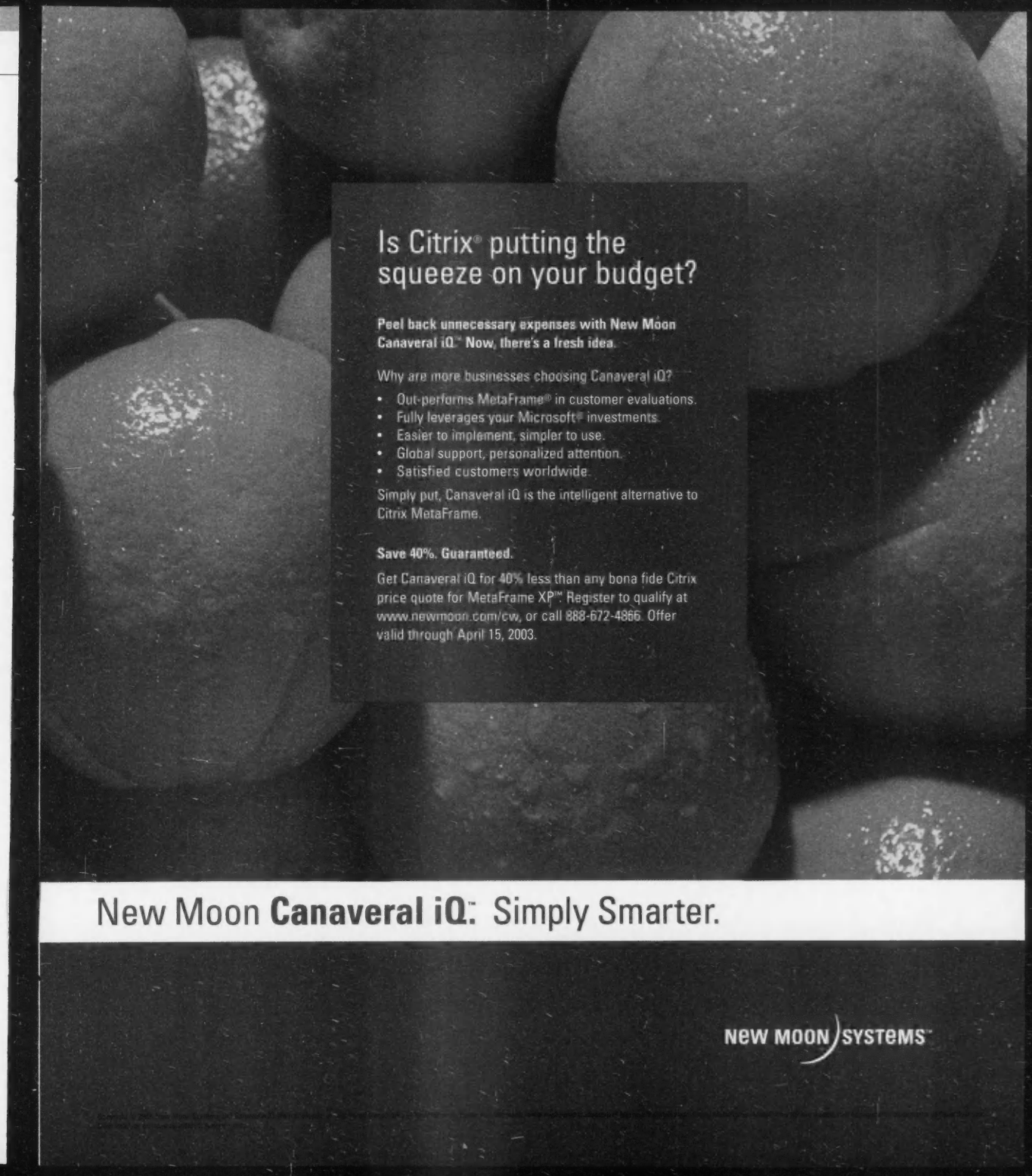
**1987:** IBM and Microsoft develop OS/2, a multitasking PC operating system.

**1991:** Finnish student **Linus Torvalds** begins work on Linux, with help from other Internet programmers.

**1993:** Microsoft merges its OS/2 work with Windows to create Windows NT.

**1999:** IBM releases its port of **Linux** for mainframes.

1940 1950 1960 1970 1980 1990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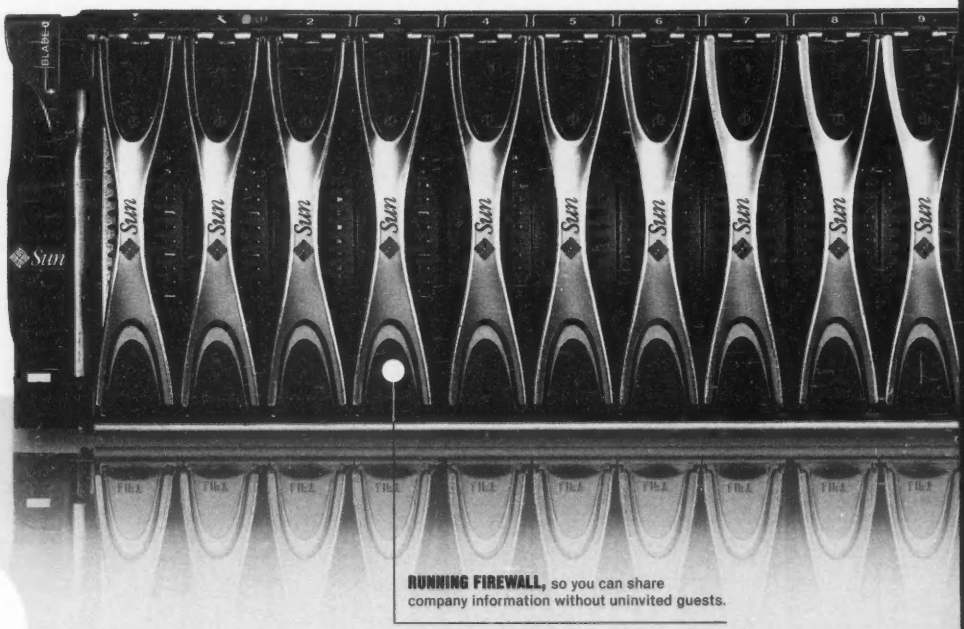


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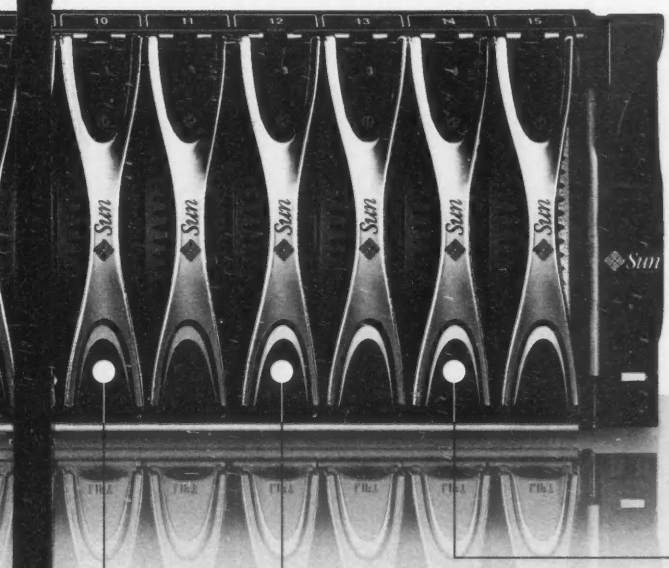

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Legions of Windows NT Server users aren't ready to jump to a new version or haven't finished upgrading. And they have darn good reasons. By Carol Sliwa

# Still on Windows NT

IT'S NO SECRET THAT MICROSOFT CORP. will direct a special marketing pitch at Windows NT Server 4.0 users when the company releases its Windows Server 2003 operating system next month, just as it did for Windows Server 2000. And its announcement of the phaseout of support for NT Server 4.0 certainly caused hordes of users to sit up and take notice.

Yet despite Microsoft's pushing and prodding, there are legions of Windows NT Server users that aren't ready to move or haven't finished their migrations.

Bob O'Brien, a group product manager in Microsoft's server division, estimates that 35% to 40% of the installed base for the Windows server operating system is using NT 4.0. He bases that in part on a year-old report in which market research firm IDC predicted it would be 33% at the end of last year.

Gartner Inc. analyst Tom Bittman thinks the number of NT Server users could be higher. Bittman says he stands by 60% to 70%, based on client anecdotes

CYRIL CARRY

and information from Microsoft.

Whichever figure is closer to the truth, one simple fact is clear: There's still a lot of Windows NT Server 4.0 in use. Period.

Microsoft knew that when it decided to extend key support options for NT 4.0 through 2004. Its aging operating system was scheduled to slip off the support charts at the end of 2003. But Microsoft couldn't afford to risk damaging relationships with its precious corporate customers, particularly the really large ones that were getting anxious about running an unsupported operating system.

O'Brien says today's NT Server 4.0 users are divided into three camps: those who have a policy to run an operating system for five to seven years, those who have key business applications and file-and-print services running on NT, and those who are too cash-strapped to do frequent upgrades.

Like any vendor, Microsoft would prefer that customers leap to new products as soon as they hit the market. But users that have stuck with NT 4.0, which has been available since July 1996, often have the following pragmatic reasons for holding out:

**THE REDMOND VIEW**

Microsoft offers advice on how to migrate from Windows Server NT 4.0 to its newest versions – and explains how NT is being "retired in phases" – at this Web page:

**www.microsoft.com/ntserver**

## 1 Big moves take time.

KeyCorp had 1,800 non-Unix servers running Lotus Notes, file-and-print services and some business applications. The Cleveland-based financial services company wanted to stay in sync with or slightly ahead of Microsoft's support phaseout, so it devised a two-year plan to go to Windows 2000, says Wade Tolman, executive vice president of enterprise technology operations.

"The biggest challenge just becomes planning, when you talk about touching that many servers and employees," says Ann Louis, vice president of enterprise technology operations at KeyCorp.

KeyCorp's IT department upgraded 450 servers — some from NT 4.0 and others from Novell Inc.'s NetWare — to Windows 2000 during the past year. Originally, the plans called for the remaining 1,300 Windows NT and 50 NetWare servers to be done by year's end, but competing projects are intervening, and the migration is expected to extend into 2004.

The delay will open the door for a new option, Windows Server 2003, which is due in April. But Tolman says he doesn't feel a sense of urgency to change the existing migration plan, since support for Windows 2000 will last for many years.

KeyCorp might instead consider skipping the Windows 2003 release and wait for its successor, codenamed Blackcomb, which Microsoft claims will be out in 2005 or 2006, Tolman says.

## 2 Business-critical applications were built for NT 4.0.

Farmers Insurance Group purchased Version 6 of Siebel Systems Inc.'s software, the core application of its claims division, in 2000, says Sherry Porter, distributed systems manager at the Los Angeles-based company.

The application was built to run on NT 4.0, and because Siebel didn't add support for Windows 2000 to that particular insurance version until the end of last year, Farmers didn't gain the option to move from NT 4.0 until recently.

As many users are well aware, vendors don't always rush to certify their older applications to run on newer operating systems.

"They won't necessarily certify it unless you have enough clout or they have some compelling reason," Porter says.

Siebel was seeing so much Windows NT among its customer base that it released Siebel 7 in November 2001 on both Windows 2000 and Windows NT 4.0, even though the newer operating system had already been out for 21 months, a spokeswoman for San Mateo, Calif-based Siebel says.

When Microsoft announced that support for NT 4.0 would end, Farmers could have upgraded to Siebel 7 on Windows 2000. But the insurer didn't find the new features useful enough to justify the expense, Porter says.

Another major consideration was that Farmers' Siebel 6 application was so heavily modified with custom code that an upgrade would have been "a dramatic amount of work," Porter says. So the IT department is drawing up a plan to move its Siebel 6 application to Windows 2000.

However, some companies don't get that option. They have to upgrade to a new application on a new operating system, stick with the old application on an unsupported operating system or buy a support contract for NT from a Microsoft partner.

## 3 NT 4.0 works just fine, thank you.

Companies that have upgraded to Windows 2000 Server may be impressed with its improved stability and performance, but many others that are still running NT find that the older OS has reached a solid enough state to meet their needs.

CE Franklin Ltd. has 16 Windows NT 4.0 servers running file-and-print, mail, intranet and terminal services. The six terminal servers may get upgraded this year, but there's no upgrade plan for the rest.

"NT is the beast we know," says David Curran, manager of IT at the Calgary, Alberta-based oil field supply company. "We know what it takes to keep it alive and healthy, and without a real strong business case to move to Windows 2000, we haven't been able to justify the expense."

The end of support may create the case that pushes Curran to consider a "grudging upgrade." But he says he doesn't think it would be dangerous to run NT unsupported. "For the most part, these servers are stable," he says.

Curran says he's intrigued by the notion of skipping Windows 2000 Server in favor of Windows Server 2003 so he can extend the life cycle of CE Franklin's server operating systems and defray licensing costs.

"You not only have to pay for server licenses; you have to pay for hundreds of client-access licenses, and that just drives the cost through the roof," says Curran.

## 4 Upgrades disrupt the business.

Like many organizations, Navy Exchange Service Command in Virginia Beach, Va., has a heterogeneous mix of servers. The retailer, which employs more than 16,000 people in 108 dispersed locations, runs its most critical applications on 100-plus Unix boxes. But it also has a collection of Novell and Windows NT servers.

"We don't see anything that's going to drive us off NT Server in a rush," says CIO Bill Finefield. "Usually by the time something like that gets to the end of its supported life, it's pretty stable. And we don't do anything exotic with it. If it's running today, chances are it'll be running tomorrow."

Finefield says it's the end of support for an application, not for an operating system, that drives upgrades at his organization. "It's not the operating system that's so important to your business," he says. "It's the applications that run on it."

One reason Finefield is reluctant to upgrade server operating systems is the disruption it would cause to Navy Exchange Service's business. Finefield cites the time that would be needed to stage, configure, test and deploy both the new operating system and any application that runs on it. Plus, new operating systems typically require more memory, processing power and storage.

"It starts a ripple effect, requiring you to invest in additional hardware and training and resources to keep up with it," he says. "After you've gone through all that, you just don't want to touch it for a while."

## 5 Where's the ROI?

Metropolitan Health Corp. in Grand Rapids, Mich., has 54 Windows NT 4.0 servers running health care, financial and supply chain applications, databases and various utilities. CIO Bill Lewkowski says that with so many applications, it's hard for his organization and its application vendors to keep up with Microsoft's new releases from a time and budget standpoint.

Also, it's hard to calculate a huge return on investment from an infrastructure upgrade in comparison with projects that directly affect end users, notes Lewkowski.

So Metropolitan Health plans to wrap its server architecture decisions in high-level business goals, says Randy Truax, manager of technical services.

Truax hopes to tie the operating system upgrade to a server consolidation project, since Metropolitan, like many companies, runs one application per NT server — often because its application vendors wrote them that way.

Metropolitan Health will also try to cost-justify the operating system upgrade by clustering servers, because Truax wants the IT department to be able to patch machines without having to take them off-line, so end users who are expected to increasingly rely on computer systems instead of paper won't lose access to their applications.

"I want to drive the cost of the infrastructure as low as I can — but not give up stability or scalability," Truax says.

# Time Is Running Out

## As IBM phases out its aging OS/390 mainframe operating system, users must migrate to z/OS. By Jaikumar Vijayan

WHEN IBM STOPPED selling its OS/390 operating system last December, the clock started ticking for users of the mainframe system to switch to the newer 64-bit z/OS. Users who delay making that transition could find themselves marooned on an unsupported platform in the not-too-distant future, users and analysts say.

This isn't a big surprise. "IBM has been very aggressively informing and reminding people about this for a number of years," says Mike Kahn, an analyst at The Clipper Group Inc. in Wellesley, Mass.

IBM released z/OS in October 2000, along with new 64-bit zSeries mainframe hardware. Already, IBM is into its fourth version of z/OS and poised to phase out support for OS/390 technology. For example, support for OS/390 Version 2.10 — which is the last OS/390 release — will cease in September 2004, while support for Version 2.09 will end this month.

The company has for some time now been telling OS/390 users to move to its latest release, z/OS 1.4, not only to ensure continued support, but also because IBM will use this release as a base for future hardware enhancements.

In addition, z/OS 1.4 is the last release of z/OS that OS/390 users will be able to migrate to in a single step. Moving to future z/OS releases from OS/390 will involve a two-step process.

Analysts estimate that more than 80% of mainframe workloads are currently running on z/OS. However, the machines running OS/390 far outnumber zSeries systems because the OS/390 machines tend to be much smaller, says Phil Payne, president of Isham Research in Great Stukeley, England. "Numerically, [OS/390 machines] account for 80% of the mainframes out there, but they don't account for much of the power," he says.

The difficulty of the migration task depends on the release of the operating system and the hardware that users are currently on, say users.

For instance, users who are on OS/390 Version 2.10 can move to z/OS 1.4 and continue running the operating system and all applications in 31-bit mode on their existing 31-bit System 390 hardware.

For such users, the migration really is no different from moving to any new operating system release, says David Danner, a Washington-based consultant who recently helped a large government agency migrate to z/OS.

For the many users who aren't ready or can't afford the move to a full 64-bit environment, which involves buying expensive new zSeries hardware, running z/OS in 31-bit mode on S/390 hardware should do nicely, users and analysts say.

The University of Florida's data center in Gainesville, for instance, has already migrated to a 31-bit z/OS environment on its existing S/390 mainframes. "It is current code, and it allows you to keep up with new functionality as you need it," says John Bevis, associate director of the data center.

### High Costs of Upgrading

But for the moment, the university has no plans to switch to 64-bit mode on z/OS because of the high upgrade costs of software licenses and hardware. "The processor and software costs can kill you," says Bevis, a former president of Share Inc., an IBM large-system user group.

"I don't think 64-bit [functionality] is what's driving some people. It's support and continued maintenance," Clipper Group's Kahn says.

Users who want to take advantage of full 64-bit functionality need to prepare well for the transition from a 31-bit environment, Danner says. Code and applications that work well in a 31-bit mode don't always migrate easily to z/OS, says Eric Bielefeld, a senior MVS systems programmer at P&H Mining Equipment, a unit of Joy Global Inc. in Milwaukee.

"We had problems with a buffering product and a data-compression product," Bielefeld says. Fixing the problems required intensive work with the vendors involved. "It took me a good six months to install and test everything," says Bielefeld, whose company moved to a z/OS environment last October.

**TECHNICAL DETAILS**

More information about migrating to z/OS is available at IBM's Web site:

**www.ibm.com/servers/eserver/zseries/zos**

Users on releases of OS/390 prior to 2.10 "face a whole bunch of change all at once," Danner says, including moving to z/OS in multiple stages.

For its part, IBM has done a lot to ease the migration to the 64-bit world, users and analysts say.

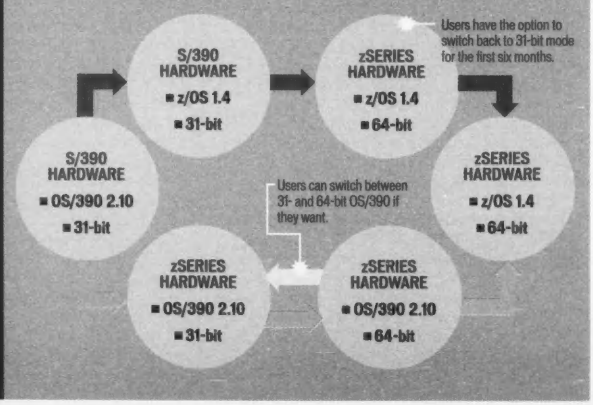
A "bimodal migration program," which allows users to switch between 31- and 64-bit mode, has been particularly useful, says Bielefeld. With it, users can move applications over to a 64-bit z/OS environment and, if problems arise, move them back to 31-bit mode while those problems are fixed.

IBM has also restructured its pricing models to minimize the software upgrade costs associated with moving to z/OS. And IBM handbooks and other materials that provide detailed technical help are available. ◗

### A Choice of Two Migration Paths

**Users running OS/390 Version 2.10 on S/390 hardware have two routes to the 64-bit z/OS:**

- Stay with their hardware but move to 31-bit z/OS Version 1.4. Then move to either z/800 or z/900 hardware and run z/OS in full 64-bit mode, with the option of switching back to 31-bit mode for the first six months.
- Continue running OS/390 Version 2.10 in 31-bit mode, but move to z/800 or z/900 hardware. Then switch to 64-bit OS/390 Version 2.10 and then to 64-bit z/OS.



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# Choose Your Path Wisely

## Sony AIT data storage **solutions** provide a strategic alternative to linear tape formats.

As Robert Frost makes clear in his famous poem, "The Road Not Taken," picking one path over another can make all the difference. While Frost had other topics in mind at the time, his point is nonetheless applicable to today's companies that are using or considering linear tape formats such as DLT, S-DLT and LTO as their data storage solution.

Legacy formats such as Digital Linear Tape (DLT) were a reasonable data storage alternative in the past, but a combination of new business challenges and new technology choices are driving many companies to rethink their tape storage path. For example, conventional DLT systems are approaching the end of their useful life cycle, with no well-defined way to add capacity without upgrading to a new format. While Super DLT (S-DLT) and Linear Tape Open (LTO) systems do have roadmaps to the future, neither format offers a compatible solution that can span the gamut of storage needs, from the entry or workstation level up to the "Super Drive" level. In addition, upgrades require a media change, making long-term use of linear solutions more cumbersome and less flexible.

Perhaps, as Frost suggests, it's time to consider a different path. Advanced Intelligent Tape™ (AIT) data storage solutions from Sony provide a broader range of capacities, increased performance, better reliability, easier maintenance and a more strategic path to the future than the alternatives. Organizations choosing the AIT path will find themselves with a more flexible and integrated tape storage format that can span backup needs from individual PCs, to workgroups, to the enterprise.

AIT is a proven storage technology with years of successful enterprise deployments behind it. First appearing in 1996, AIT is a compact, helical scan 8MM tape format in a 3.5-in., half-height form factor. With its high capacity (up to 100GB per cassette), speed and reliability, AIT is emerging as a more strategic tape storage path compared with linear formats such as DLT, S-DLT and LTO. Consider the following advantages of AIT:

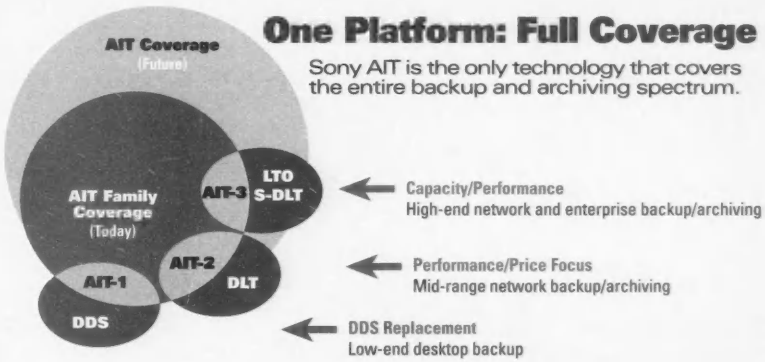
- **Reliability** – Consistent operation and assured reliability are two critical components for a tape storage system. AIT-3 drives are designed for a mean time between failure (MTBF) of up to 400,000 hours (compared with DLT's 250,000 MTBF rating) and a 100% duty cycle.

In contrast, DLT-IV media is notoriously unreliable, subject to the often severe leader problems that are common for leader-based tapes. AIT, on the other hand, has a soft loading system, which allows it to load the media without using motors or levers. This greatly decreases the stress on the tapes and increases the longevity of the media. In fact, AIT can even perform a soft load from the middle of the tape.

- **Performance** – With organizations facing increasingly larger backup volumes and a greater need for faster recoveries for business continuity, drive performance is critical. For large backup applications, AIT compares favorably with the higher speeds of S-DLT and LTO. But for interactive applications, AIT is far faster because of its superior load, seek and rewind times. For example, AIT has a 39-second access speed, compared to 80 seconds for S-DLT and LTO.
- **Migration Path** – Currently in its third generation, AIT has a defined and proven roadmap that has seen performance and capacity double with each new generation. In addition, all three generations of AIT drives available today are both read and write backward-compatible. S-DLT drives, on the other hand, can not write to DLT cartridges, severely limiting their usefulness.
- **Industry Support** – AIT was created by Sony, one of the co-inventors of the Digital Data Storage (DDS) tape format, and AIT is an open technology supported by more than 27 partners, including HP/Compaq, Qualstar, Advanced Digital Information Corp. (ADIC) and Spectra Logic. In addition, leading backup software packages such as Veritas Software's Veritas Backup Exec and NetBackup, Legato Systems' NetWorker and Computer Associates' CA BrightStor ARCserve are all compatible with the AIT format.
- **Size** – In backup, less is more. For example, AIT-3 provides at least 250% greater capacity than DLT. At its 100GB capacity, AIT tapes are comparable to S-DLT 110GB and LTO 100GB models, but at just one-third the size. Simply put, this means it's much easier to use AIT for automation and tape libraries because it takes up so much less room. In fact, many companies are able to get twice the number of AIT drives in a given library compared with traditional half-inch drives. AIT also has the world's first 1U autoloader (courtesy of its low power consumption and small media size), making it the perfect fit for tight locations.

Some organizations fear that switching to a different backup tape format will be difficult and costly. But it can be done painlessly. If you follow a standard 30-day backup cycle, most of your organization's data will be on newer AIT tapes within a month.. In addition, Sony bundles NovaStor migration tape copy software with each AIT tape drive or library, making it easy to copy critical or frequently-used tapes from other formats onto AIT.

Data backups should be there when you need them. But you shouldn't have to dedicate valuable IT personnel to maintaining finicky tape drives, juggle dozens of tapes to find what you're looking for or wait minutes (or hours or days) to retrieve valuable data. Sony's AIT data storage solutions enable organizations to get on the right path for compatible, reliable and high-performance tape backup. AIT is simply the smart investment.




## Tale of the Tape

| Tape format | Capacity |
|---|---|
| **Digital Linear Tape (DLT)** | **10GB to 40GB** |
| **Super DLT (S-DLT)** | **50GB to 110GB** |
| **Linear Tape Open (LTO)** | **100GB to 200GB** |
| **Sony Advanced Intelligent Tape (AIT)** | **25GB to 100GB** |

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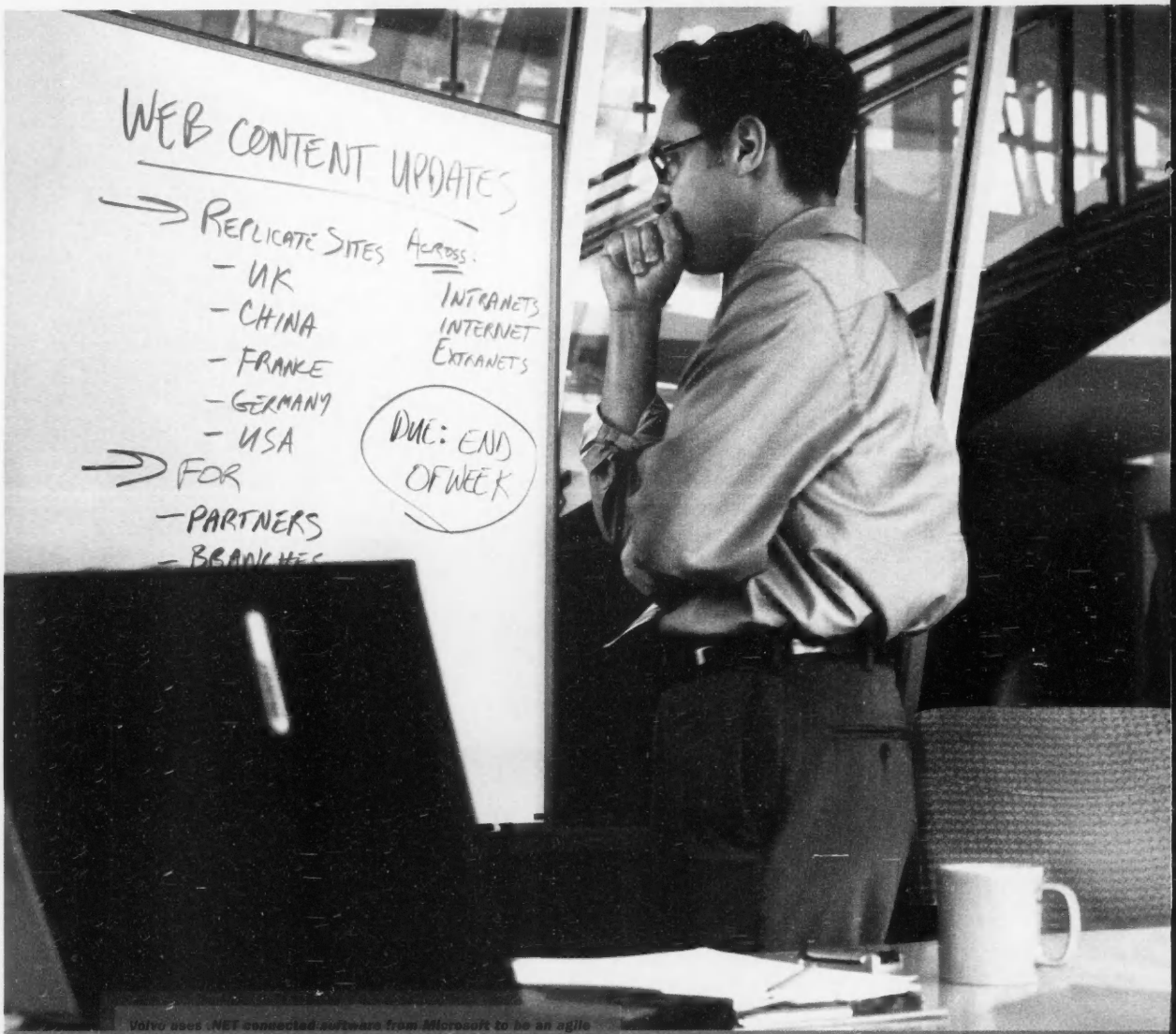
## Sony AIT Solutions

**Download the free white paper, "Sony AIT: A New Path to Business Value," and learn more about Sony storage solutions. Visit www.nwfusion.com/sony/HLFCW**

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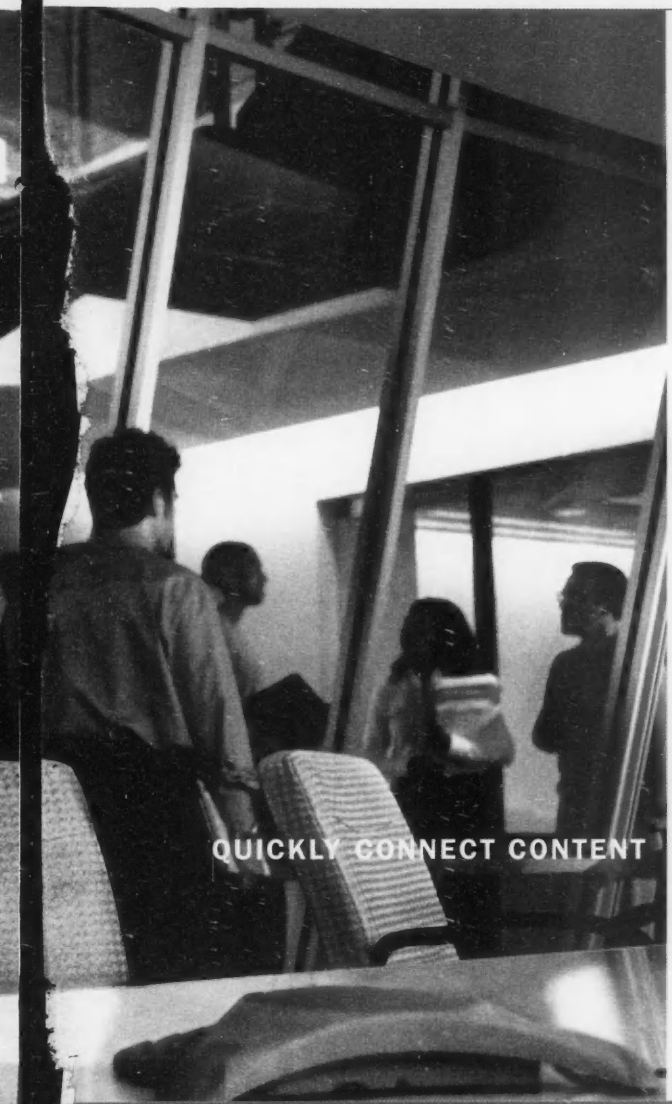

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# Getting Started With Linux

Worried about version control and support? Here's a guide for Linux newbies.

By Robert L. Scheier

TO HEAR SOME PEOPLE TELL it, Linux is taking the world by storm. Unilever, a $52 billion consumer products giant, is switching to Linux to run its businesses around the world. Major vendors such as IBM, SAP AG and Computer Associates International Inc. are porting mainstream business applications and utilities to the low-cost, open-source operating system.

But not every IT shop is out on the leading edge of Linux; many are just starting to explore the open-source phenomenon. For them, Linux's practical implications are a major concern. IT managers face day-to-day challenges such as how to perform version control and how to back up and restore data. They also need to know how much training their staffs will need and whom to call for technical support at 2 a.m.

The good news: You can do almost anything on Linux that you can do on a mainframe or distributed systems. The bad news: It will require you to learn some new concepts and terminology.

## 1. Version Control

You may think of the open-source community as worldwide chaos, with developers releasing dozens or hundreds of bug fixes and updates each month that need to be evaluated and tested before deployment. Actually, it's not that different from the computing environments IT managers have lived in for years, say some users.

"Microsoft is announcing a new security breach [that requires patching] almost every day," says Dan Agronow, vice president of technology at Atlanta-based weather forecasting service The Weather Channel Interactive Inc., which runs Weather.com. And mainframe vendors find highly pervasive errors in their operating systems just as often.

That doesn't mean open-source updates can't seem, well, chaotic. In the past year, Islandia, N.Y.-based CA has seen almost 20 versions of the operating system kernels for different flavors of Linux, says Vincent Re, chief architect at CA. If you're a business customer, you're likely buying a distribution from a major vendor, such as Red Hat Inc., SuSE Linux AG or The SCO Group, that tests the updates, packages them and sends them to customers through Internet services such as the Red Hat Network.

Vendors usually provide updates only for their own Linux distributions; customers must go to other software vendors for updates to other Linux-based utilities or business applications. (For example, Red Hat doesn't distribute Oracle Corp.'s Linux offerings.)

As with Unix, in the Linux world, version control is referred to as "package management," says Erik Troan, director of product marketing at Red Hat in Raleigh, N.C. Each package is a single file that comes with metadata containing critical information such as which version of the Linux kernel and which associated software is needed to run the file, he says.

Customers with strong Unix skills can test and evaluate the updates themselves, says Re. Version control tools include the Red Hat Package Manager, which can also manage updates from other distributors. The Caldera VolutionManager from SCO in Lindon, Utah, combines software distribution with services such as asset management and system monitoring. Third-party tools include CA's AllFusion Harvest Change Manager for distributed Linux systems and its Unicenter Software Delivery for Linux on the mainframe.

Update tools such as the Red Hat Package Manager aren't perfect, of course. Red Hat won't support rollback (reversing a software update if it doesn't work) until the next release of its Advanced Server and Advanced Workstation in the fall, says Troan. Rollback is already available in Version 1.2 of Red Carpet Enterprise from Ximian Inc. in Boston.

Customers also face uncertainty over whether the new patches will run older applications or device drivers. Linux "doesn't have the reputation for forward and backward compatibility" customers have come to expect from mainframe operating systems such as z/OS, says Re. Some

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## Agenda Snapshot*

For details, updates, and to register visit **www.snwusa.com/expo**

*subject to change

### Monday, April 14
**(Pre-Conference Activity and Tutorial Sessions)**

| | |
|---|---|
| 9:30am-11:00am | Primer |
| 12:00pm-5:00pm | Golf Outing |
| 1:00pm-2:00pm | SNIA Tutorial Sessions - choose from five different sessions |
| 2:00pm-2:10pm | Break |
| 2:10pm-3:10pm | SNIA Tutorial Sessions - choose from five different sessions |
| 3:10pm-3:20pm | Break |
| 3:20pm-4:20pm | SNIA Tutorial Sessions - choose from five different sessions |
| 4:20pm-4:30pm | Break |
| 4:30pm-5:30pm | SNIA Tutorial Sessions - choose from five different sessions |
| 7:00pm-9:00pm | Pre Conference Networking Reception |

### Tuesday, April 15
**(General Conference - Day One)**

| | |
|---|---|
| 7:15am-8:15am | Continental Breakfast |
| 8:30am-9:15am | Opening Keynote: Regis McKenna |
| 9:15am-12:00pm | General Sessions |
| 12:15pm-1:30pm | Networking Luncheon |
| 1:45pm-4:00pm | General Sessions |
| 4:00pm-5:30pm | Technical, Technical/Business and Business Tracks |
| 5:30pm-8:30pm | Expo, Buffet Dinner, Interoperability and Solutions Demo |

### Wednesday, April 16
**(General Conference - Day Two)**

| | |
|---|---|
| 7:15am-8:15am | Continental Breakfast |
| 8:30am-9:05am | Opening Keynote: David Chamberlain |
| 9:15am-12:00pm | General Sessions |
| 12:00pm-1:30pm | Expo, Buffet Luncheon |
| 12:00pm-7:15pm | Interoperability and Solutions Demo Open |
| 1:45pm-3:50pm | General Sessions |
| 3:50pm-4:00pm | Break |
| 4:00pm-5:00pm | Technical, Technical/Business and Business Tracks |
| 5:15pm-7:15pm | Expo Open |
| 7:30pm-9:00pm | Gala Evening |

### Thursday, April 17
**(Tutorial and Workshop Sessions)**

| | |
|---|---|
| 7:30am-8:30am | Continental Breakfast |
| 8:30am-11:45am | Technical, Technical/Business and Business Tracks |
| 11:45am | Conference Concludes |

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| Options for IT End-Users* | Pre-Registration (through April 11th) | On-Site Registration (after April 11th) |
|---|---|---|
| General Conference Package (Apr. 15, 16): (Includes Expo, Meals and Receptions) | $1,095 | $1,245 |
| Total 4-day Package (Apr. 14, 15, 16, 17): (Includes General Conference Package; Technical and Business Tracks; SNIA-produced Tutorials; SNIA-Certification "Test-Ready" Courses; Expo, Meals and Receptions) | $1,490 | $1,690 |
| **Options for IT Vendors**** | | |
| Total 4-day Package (Apr. 14, 15, 16, 17): (Available to Sponsoring Vendors and their Resellers/Integrators; Industry Consultants; and Storage Solutions Implementors) | $1,490 | $1,690 |
| Non-Sponsoring/Exhibiting Vendor Package: | $5,000 | $5,000 |

* See IT End-Users description on the Registration Application on the reverse. ** See Non-Sponsoring Vendor description on the Registration Application on the reverse.

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- ❑ Less than 100

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- ❑ $10 Billion+
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**Annual company IT budget (All IT products and services):**
- ❑ $100 Million+
- ❑ $50 Million - $99.9 Million
- ❑ $20 Million - $49.9 Million
- ❑ $10 Million - $19.9 Million
- ❑ $5 Million - $9.9 Million
- ❑ $1 Million - $4.9 Million
- ❑ $500,000 - $999,999
- ❑ Less than $500,000

**Annual company IT budget (Storage products and services):**
- ❑ $100 Million+
- ❑ $50 Million - $99.9 Million
- ❑ $20 Million - $49.9 Million
- ❑ $10 Million - $19.9 Million
- ❑ $5 Million - $9.9 Million
- ❑ $1 Million - $4.9 Million
- ❑ $500,000 - $999,999
- ❑ Less than $500,000

**Your personal IT spending authority (All IT products and services):**
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- ❑ $50 Million - $99.9 Million
- ❑ $20 Million - $49.9 Million
- ❑ $10 Million - $19.9 Million
- ❑ $5 Million - $9.9 Million
- ❑ $1 Million - $4.9 Million
- ❑ $500,000 - $999,999
- ❑ Less than $500,000

**Your personal IT spending authority (Storage products and services):**
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- ❑ $50 Million - $99.9 Million
- ❑ $20 Million - $49.9 Million
- ❑ $10 Million - $19.9 Million
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3) The registration fee will be refunded, less $250 service charge, if written notice is received by March 31, 2003.

**Computerworld reserves the right to limit and/or refuse any registration for any reason.**

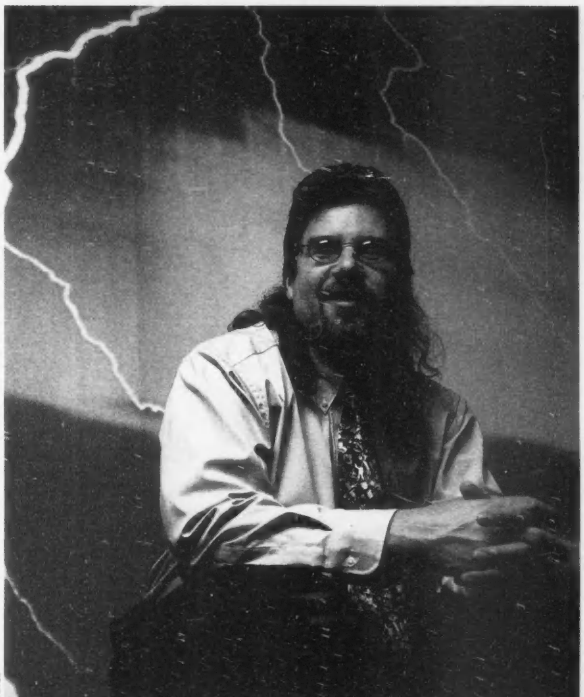
### Schedule of Conference Events *(subject to change)*

**Monday, April 14, 2003**
- Pre-Conference Golf Outing
- Pre-Conference Networking Reception
- Tutorial Sessions

**Tuesday, April 15, 2003**
- General Conference
- Interoperability and Solutions Demo
- Exposition

**Wednesday, April 16, 2003**
- General Conference
- Interoperability and Solutions Demo
- Exposition
- Gala Evening

**Thursday, April 17, 2003**
- Tutorial Sessions



ANN STATES

The Weather Channel's Dan Agronow updates his 250 Linux servers once each quarter.

distributors have also balked at including device drivers or other software from vendors that have refused to include the source code in order to keep it from competitors.

Jeff Davis, global technical lead at Amerada Hess Corp., uses Red Carpet Enterprise to update about 350 servers running various versions of Red Hat Linux. The tool lets the New York-based energy company create "channels" that automatically send updates for the Apache Web server to Linux servers but not to Linux desktop systems.

But just as with Windows or mainframes, no good IT manager applies those Linux patches willy-nilly. Instead, says Agronow, "you have a scheduled maintenance cycle." Agronow updates his approximately 250 Linux servers once per quarter, only after testing to be sure the updates are safe.

**LINUX FOR SURFERS**

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## 2. Support

You can get as much hand-holding as you want (and are willing to pay for) from the Linux distributors or better-known vendors such as IBM and Hewlett-Packard Co.

"Just because the development model is open doesn't mean the support model is any different than what you'd find with a proprietary OS," says Timothy D. Witham, lab director at the Open Source Development Lab in Beaverton, Ore., and a *Computerworld.com* columnist [QuickLink 36148]. Or, if you have the skills and mind-set, you can turn to the open-source community itself and get better support than you would from a vendor you paid, say some customers.

When calling IBM for support with its WebSphere application server, Agronow had to slog through a script of questions read by a first-level support technician before being referred to an expert who could solve the problem.

After migrating to the Tomcat open-source application server in June 2000, he used Web sites and forums to get his questions "out to many different experts all at the same time." Not only did Agronow get answers more quickly, but he rarely was told to upgrade to "the latest and greatest version" of the vendor's software to fix the problem, he says.

Major vendors such as IBM and HP offer round-the-clock service, as do Linux distributors such as Red Hat and SCO. "A number of Fortune 100 companies, such as Morgan Stanley, rely on our support every day," says Red Hat's Troan. Such support is included along with all upgrades and bug fixes with Red Hat's Advanced Server Premium Edition license for $2,500 per machine per year.

## 3. Training

If you're coming from a well-trained Unix shop, anywhere from a couple of days to a couple of weeks should be enough to get you going on Linux, say vendors, analysts and customers. Staffers coming from a Unix or Windows background will, however, need training on functions such as partitioning before managing IBM's z/VM mainframe operating system, says Re.

Becoming a Red Hat Certified Technician generally requires two weeks of training, with another two weeks to become a higher-level Red Hat Certified Engineer, says Troan. Agronow says he wants one to two years of job experience for a junior administrator and four to six years for a senior administrator.

Many customers, such as Amerada Hess' Davis, are skeptical about the value of the several flavors of Linux certification available on the market.

One hopeful note on training: Davis says Linux requires less ongoing training than Windows because there are fewer differences among the various flavors of Linux than there are between, say, Windows NT and Windows 2000. With Linux, he says, "we're not retraining our staff every time a new version comes out."

### Best Practices Count

Overall, the customers and analysts say that critical data-center tools and processes are rapidly moving to Linux. "If you're coming from a background where you have the disciplines in place for communicating changes, making changes and doing upgrades, and you apply those disciplines, you're going to have success," says Agronow. "If you're in an environment which is a free-for-all, where things are constantly changing and there are no controls and no standards," he says, you're going to fail — with Linux or with any other operating system.

*Scheier is a freelance writer in Boylston, Mass. He can be reached at rscheier@charter.net.*

## No Big Deal

**THERE ARE SOME ISSUES that might seem worrisome to an IT administrator who's new to Linux, but they're really no problem once you look more closely. Among the areas you don't have to sweat, say customers, analysts and vendors, are backup and restore tasks, clustering and fail-over.**

**When it comes to data protection, most major vendors have ported their premier backup-and-restore tools to Linux. Examples include IBM's Tivoli Storage Manager, CA's ARCserve for Linux running on Intel systems, and CA's Brightstor for Linux on the mainframe.**

**To build clusters of Linux servers for instant fail-over in the event of a server crash, customers can use configuration scripts offered at Web sites such as that of the High-Availability Linux Project (*www.linux-ha.org*).**

**They can also use tools from distributors, such as the Cluster Manager Package for Red Hat's Advanced Server, or third-party tools such as LifeKeeper from SteelEye Technologies Inc. in Mountain View, Calif., and Matrix HA from PolyServe Inc. in San Francisco.**

**Some customers are finding that they can get faster fail-over and less of a performance hit when clustering Linux servers than when clustering Windows servers, says Vincent Re, chief architect at CA.**

***– Robert L. Scheier***

# Logical Volume Manager

DEFINITION

A **logical volume manager** is a software tool that allows storage drive space to be added or expanded on the fly without system reboots or shutdowns, giving systems administrators more flexibility for operations.

BY TODD R. WEISS

As Linux systems administrators watch over their hardware and software infrastructures, they constantly have to look ahead to how much space to allocate to hard-disk partitions to meet changing needs.

But the process of adding disks or reconfiguring existing drive space is slowed when servers have to be taken off-line for new drive installation and time-consuming rebooting or backup, repartitioning and data restoration.

Those changes can more easily be made using a logical volume manager (LVM), which precludes the need for reboots, shutdowns or downtime. Thus, an LVM can be an administrator's best friend.

Microsoft's Windows and Sun's Solaris and other Unix operating systems have similar volume manager capabilities.

Under Linux, an LVM is enabled by a kernel-loadable module, similar to a device driver in Windows. Kernel modules capture disk functions from user operations and convert them to write to the correct part of the disk. They work like a file system driver, but are far more dynamic.

Support for an LVM wasn't built into the Linux kernel until Version 2.4, but it was available as an add-on. It has been an important tool as Linux continues to make its way into enterprise computing.

"It's a common feature because it's so useful," says Chris Mason, a Linux kernel developer at Nuremburg, Germany-based Linux vendor SuSE Linux AG. "A lot of people, especially in Windows, may not know a lot about it," Mason says. "It's an extra layer to learn about, so a lot of people don't. Then when they move from a smaller server to a larger server, they don't realize how much more easily they can make it work."

The LVM creates an abstraction layer over all the combined storage in a system, so that the details about where the data actually resides are hidden. That allows the total separation of hardware and software because the LVM keeps a table of where the data is written and what volume group and volume it belongs to, allowing drives to be added or changed even while the system is running. And all this happens without software applications or users noticing the changes.

Systems without LVMs are also set up with physical hard drives, but they don't have this virtualization layer. When more disk space is needed, the system must be shut down and the new drives installed, and then they must be provided with file systems to organize data storage. If the new drive is replacing the original drive, the old drive must be backed up so the new drive can receive its data. That all takes time.

## Organized Resources

With an LVM, the physical drives or hard disks are organized into "volume groups." Created inside those volume groups are "logical volumes," which are comparable to disk partitions in systems without LVMs. By keeping the hardware and software separate, drive changes can be made without shutdown or rebooting, and data can be moved to a different location while the system is running.

Joaquin Ruiz, vice president of marketing and product management at Minneapolis-based Sistina Software Inc., which has largely developed the LVM for Linux as an open-source program, says the LVM is important because it makes it much easier to administer storage.

## Management Is Key

"The bottom line is management," Ruiz says. Without a volume manager, the burden of how to represent and deal with data storage is left up to the developer of the application you want to run, he says. That potentially permits "applications to be stepping on other applications" as they compete for disk space, says Ruiz. That's why all robust operating systems have volume management features, he says.

Sistina contributed the LVM technology to the Linux open-source community to improve the lineage, he says. By adding the LVM, Linux becomes more scalable. The LVM aggregates information about physical volumes, which are the actual hard-disk partitions, and presents them through the file system to the applications.

Sistina's LVM is supported by the standard Linux kernel version, beginning with 2.4, Red Hat 7.3 and Red Hat 2.1 Advanced Server editions, and is built natively into Red Hat 8.0. It is also supported by SuSE 7.3 and 8.0 and SuSE Linux Enterprise Server 7. SuSE was an early supporter of the LVM and has included the Sistina LVM in all its operating systems since SuSE Linux 6.3. It was also built into UnitedLinux Version 1.0, which is packaged and sold by the four UnitedLinux partners. It's compatible with all major Linux applications, including Web applications, databases and the Samba file-sharing system.

Brian Stevens, senior director of engineering at Red Hat Inc. in Raleigh, N.C., says the LVM addresses three areas for IT administrators: availability, performance and manageability of storage drive space. "Administrators love it because it gives control, uptime and doesn't waste space," he says.

Presently, the Red Hat Linux Advanced Server operating system doesn't include an LVM natively, but Red Hat partners with Veritas Software Corp. in Mountain View, Calif., to offer an LVM as an add-on. LVM software will be included in the next version of Advanced Server, Stevens says. Red Hat is more concerned with adding to the OS enterprise-mandated features such as scalability, threading and clustering capabilities before adding an LVM, even though customers have asked for it, Stevens says.

"It is a committed feature for the next version," he says.

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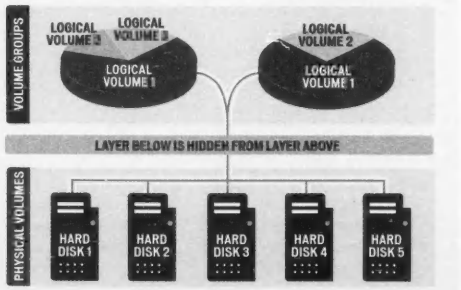
## How It Works

**A logical volume manager puts the physical entities (physical volumes) into storage pools called volume groups. An LVM can manage whole SCSI or IDE disks and partitions in a volume group, as well as hardware and even software RAID devices. A volume group is the equivalent of a physical disk from the system's point of view. The equivalent of partitions into which the storage space is divided is called a logical volume.**



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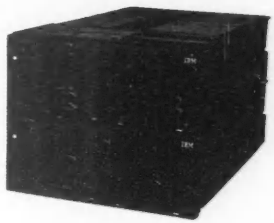

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# Strength in Numbers?

## UnitedLinux, an alliance of four companies battling the Red Hat juggernaut, has made some progress in its first 10 months. Here's an update. By Todd R. Weiss

A YEAR AGO, they were rivals, four companies each fighting for a tiny share of the Linux server market but not gaining much ground on U.S. market leader Red Hat Inc.

Then last May, the rivalry was replaced by a partnership called UnitedLinux, bringing the former competitors together to share technology, expertise and development costs as they worked to build a standardized, enterprise-ready Linux operating system to compete head-on with Red Hat's best.

How have the first 10 months shaped up for UnitedLinux partners SuSE Linux AG in Nuremberg, Germany; The SCO Group Inc. in Lindon, Utah; Turbolinux Inc. in Tokyo; and Conectiva SA in Curitiba, Brazil?

"I think they can be successful," says Bill Claybrook, an analyst at Aberdeen Group Inc. in Boston. "UnitedLinux and Red Hat will share the U.S. market, which is a pretty large market. Each company, though, still has to be successful alone."

Claybrook says the partnership offers the companies economies of scale. "They are sharing a number of costs that are not talked about publicly that lower their overall development and support costs," he says. The alliance's version of Linux will likely be the boost that some of the current and potential partners need to keep going, he says.

So far, the effort has shown progress by attracting independent software vendors to port their applications to UnitedLinux and by creating common support and call centers to help customers, Claybrook says. "I would give them an A- at this point; however, we will see a lot more in the next year. One thing the UnitedLinux members have going for them is the [operating system] itself. I would give it an A+."

"Each of the vendors individually didn't have a whole lot of market penetration" before joining up, says IDC analyst Al Gillen. "What they've done in effect is put all their cards together to have a bigger deck."

Gillen says he would have argued a year ago that Wakefield, Mass.-based UnitedLinux would have a tough time taking on Red Hat's dominance. But since then, Raleigh, N.C.-based Red Hat changed its server licensing, requiring customers to purchase a copy of its server operating system for each machine, just as UnitedLinux requires. "Because those terms are more restrictive than a traditional Linux license, it levels the playing field somewhat," Gillen says.

Here's what the alliance has offered users in its first 10 months:

### Uniformity and Robustness

Gregory Blepp, SuSE vice president of international sales, says customers have gained uniformity and robustness under UnitedLinux. Although none of the companies has a worldwide presence, each has local market strengths that helped build the alliance, he says. "The real global coverage was missing . . . so this was one of the driving factors of UnitedLinux," Blepp says.

The companies sell their own branded versions of UnitedLinux. The core operating system is the same in each, but extra add-ins vary. Each company ships its own version on four CDs, including three with the core UnitedLinux ingredients.

The first version of UnitedLinux Enterprise Server, based on SuSE's Linux Enterprise Server 7, was released on schedule in November, and a "carrier-grade" version for the telecommunications industry is in the works.

### Easier App Certification

With UnitedLinux, software vendors can now build just one version of an application for certification on one platform, instead of having to get it certified with each of the four companies, Blepp says. That saves costly porting, testing and certification steps and is already encouraging more developers to create new business applications for UnitedLinux, he says.

Each partner adds special attributes, he says. SuSE and SCO bring combined development resources, while Turbolinux brings expertise in localizing the Linux distributions for many different spoken languages. Conectiva specializes in easy deployment and support.

Stacey Quandt, an analyst at Giga Information Group Inc. in Cambridge, Mass., says the alliance got off to a slow start by not providing an easy means for software developers to port their products to UnitedLinux. That changed with the announcement in January of a UnitedLinux Developer Zone Web site. "It was a major shortcoming, and now they have addressed that," Quandt says.

### Longer Cycle Times

Paula Hunter, general manager of UnitedLinux, says another key benefit for corporate users is that the partnership has scheduled release cycles for future upgrades that are longer than traditional open-source software release cycles. That gives business users more time to be sure their needed applications will run well, she says.

Moreover, the alliance can provide support to customers from any of the partners as needed, Hunter says. "It's important to realize that we're a global concern," she says.

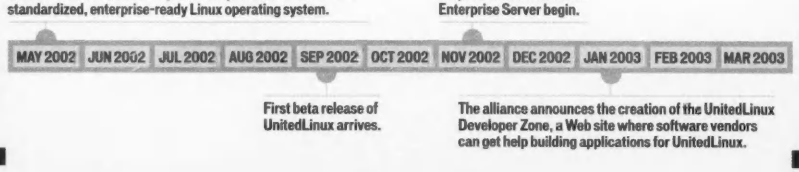
Hunter says that because UnitedLinux didn't begin shipping its server operating system until November, analysts haven't yet recognized its growing popularity among customers. "It's still a little early for them to be counting [unit] shipments. We are winning major brand-name accounts here in the U.S. We recognize that's where the analysts want to see traction," she says.

Late last year, Turbolinux sold its operating system business to Software Research Associates Inc. in Tokyo, which is continuing the partnership in UnitedLinux, says Fumiko Doi, director of marketing at Turbolinux. The company remains committed to the effort, she says.

IBM, Hewlett-Packard Co. and Advanced Micro Devices Inc. have signed on as technology partners in support of UnitedLinux. IBM and HP are supporting both Red Hat and UnitedLinux on their Linux hardware.

Quandt says that even as the No. 2 player in the U.S. market, UnitedLinux "has the potential to chip away at Red Hat's leadership if its [software vendor] ecosystem matures rapidly." Elsewhere in the world — Europe, the Middle East, Africa, Latin America and the Asia-Pacific region — Red Hat's penetration is lesser and often exceeded by the individual UnitedLinux partners. In such places, UnitedLinux could erode Red Hat's market share, she says.

## UnitedLinux Arrives



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# The Worldwide Code Rebellion

## Discontent over proprietary software from U.S.-dominated vendors has foreign governments exploring open source. By Patrick Thibodeau

OPEN-SOURCE SOFTWARE is gaining ground with governments in Europe and elsewhere, as officials look for ways to cut IT expenses and free themselves of dependence on U.S.-based vendors.

This isn't a short-term phenomenon. It's a worldwide movement, and there are a lot of reasons behind it.

Governments are concerned about proprietary lock-in on things as basic as document and spreadsheet file formats, and they're leery of using software that may reach the dead end of planned obsolescence. They also aren't happy about paying costly licensing fees to foreign suppliers for products that don't meet all their needs.

The U.K.'s National Health Service, in a study last year on the feasibility of open source, warned that the market for health care IT is becoming dominated by a small number of U.S.-based vendors. These systems are expensive to buy and maintain, and since "the U.K. represents a relatively small part of the market, global suppliers are unresponsive to requests for local variations, and/or provide them at a very high cost," the report says.

"It's about money, plain old-fashioned money," says Atul Chitnis, a Linux expert at Exocore Consulting Ltd. in Bangalore, India, in an e-mail interview about that country's moves to open source. "But it's also a bit about sovereignty." Chitnis is an adviser to the government-sponsored Linux India Initiative, announced last year.

One goal of pushing open source is to foster the development of homegrown high-tech businesses and expertise. The movement is also related to feelings about Microsoft Corp.'s worldwide dominance in productivity applications and desktop operating systems. Carol Kelly, an analyst at Meta Group Inc., calls it the "Microsoft backlash." But while some local agencies are considering or have deployed Linux desktop systems, most of the governmental interest is in server deployments.

### Stirring the Pot

Indeed, the European Commission is involved in multiyear studies examining open-source development for server software and its total cost of ownership. There are obvious licensing savings with open-source models, but total cost of ownership is a pot with many ingredients, including integration, training and migration.

A European Commission-backed study completed last year advocates "pooling," or sharing, of open-source software code among various countries, as well as sharing IT knowledge and development expertise. Pooling may not necessarily save money, but by working together, governments may get much more for their euros.

"Pooling of knowledge is more important than pooling of code," says Patrice-Emmanuel Schmitz, a Belgium-based Unisys Corp. consultant who co-authored the report.

Governments in Europe, Singapore, Taiwan, China and elsewhere are adopting policies that encourage IT managers to consider deploying open-source systems. In the U.S., neither the federal government nor any states have adopted anything similar, but federal officials are showing interest in open source at the midrange server level.

### Tight Budgets, Lean Code

The revenue shortfalls that are forcing many states to curtail IT investments are also fostering more interest in open-source software. "What we're finding is an awful lot of good tools that are open-source-based that offer a tremendous amount of functionality," says Rock Regan, CIO for Connecticut's state government. "In some cases, we don't need the Cadillac version of software that some vendors have sold."

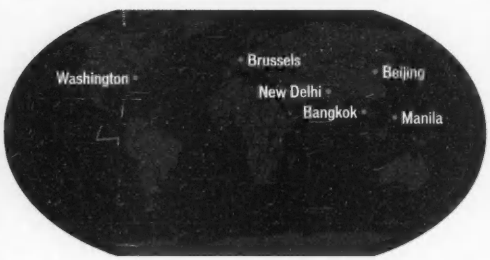
It's difficult to say whether any government interest in open source will influence private-sector migrations, especially when big firms like IBM are already Linux advocates.

In the U.S., it's long been recognized in IT that the private sector leads and governments follow, says Eric Raymond, a Malvern, Pa.-based developer who heads the Open Source Initiative. But in some foreign nations, businesses "view governments as the genuine leadership of the country," he says.

One thing to watch for is whether large governments establish procurement policies that require software vendors to provide open and interoperable file formats in order to get government business.

The Consumer Project on Technology (CPT) in Washington has been urging the White House to do just that, as a way to blunt Microsoft's operating system monopoly. Only a big government has the buying power to force a vendor to make changes, says CPT head James Love. "There is nobody in the private sector that is big enough to set standards by themselves," he says.

### The Open-Source Vanguard




**Washington:** The U.S. federal government's interest in Linux is expanding beyond scientific users such as NASA.

**Brussels:** The European Community is funding research on open-source software.

**New Delhi:** India's government is backing an initiative to study open-source software use in the government and other sectors.

**Beijing, Bangkok, Manila:** China, Thailand and the Philippines have initiatives under way to foster the use of open-source software.

### Q&A WITH EUROPE'S IT LEADER

Philippe Aigrain, the European Commission's top software policy official, discusses the open-source initiatives under way in Europe:

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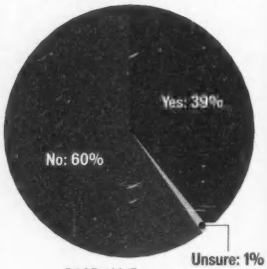
## SNAPSHOTS

### Linux Growth

**Do you plan to increase your company's deployment of Linux this year?**




**BASE:** 100 IT managers

SOURCE: THE GOLDMAN SACHS GROUP INC., NEW YORK, JANUARY 2003

### Mission-critical?

**When will you run mission-critical applications and databases on Linux?**

| | |
|---|---|
| 2003: | 7% |
| 2004: | 10% |
| 2005: | 8% |
| 2006: | 4% |
| 2007 or beyond: | 8% |
| Never: | 11% |
| Don't know: | 53% |

**BASE:** 178 respondents at Gartner's 2002 Data Center Conference; total exceeds 100% because of rounding

SOURCE: GARTNER INC., STAMFORD, CONN., JANUARY 2003

### Windows Replacement

**Would you consider replacing or bypassing Windows servers with Linux if near-equivalent applications existed for Linux?**

| | |
|---|---|
| December 2001: | Yes: 53% |
| December 2002: | Yes: 77% |

Base: 179 respondents at Gartner's Data Center Conferences

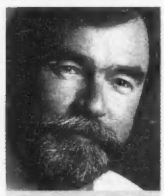
SOURCE: GARTNER INC., STAMFORD, CONN., JANUARY 2003

MARK HALL

# Does the OS Matter?

TALK TO BILL GATES. Talk to Linus Torvalds. Talk to Steve Jobs. What you'll hear is that operating systems matter a lot. Talk to a CIO, and you'll hear something quite different.

I've been talking to quite a few senior IT executives at dozens of large organizations — from Boeing and FedEx to state governments and major universities — and while everyone agrees that operating systems are important parts of their IT infrastructures, they also agree that they matter less and less. Even though the compelling controversy of Linux vs. Windows may keep developers and systems administrators awake at night, the people at the top of the IT food chain aren't losing sleep over the debate. Knowing that is probably giving Microsoft's chief software architect a nightmare or two.



MARK HALL is *Computerworld*'s opinions editor. Contact him at mark_hall@computerworld.com.

That's not to say that staff concerns about the pluses or minuses of one technology over another don't matter. They do. But they're tactical issues that are internal to IT and not strategic issues about the business, which are what CIOs think about.

Plus, operating system maturity permits CIOs to ignore the "problem." For the first time in memory, standard, proven, supported and, for the most part, reliable and fast operating systems cover the gamut of IT needs. When the answer to your question is always just around the corner, you cease to concern yourself with the problem. Believe me, for IT strategists, the operating system debate is all but dead.

Need to deploy PDAs to your sales force? Need a Web, database or file-and-print server? Which operating system to choose isn't the first question you'll ponder. Instead, you'll ask yourself: Are the right applications available? Does our IT staff have the training to work with the new system? Will it fit into our budget? Can it be customized? Who will service and support the technology?

Naturally, the choice of operating system is crucial. But there's no right or wrong answer here.

At the high end, Unix proponents can't legitimately slam the competition (read: Windows) as not having the performance, reliability, scalability or breadth of applications to compete for data center environments. For departmental and Web servers, Microsoft can't chide Linux users that they'll be left in the cold if they adopt the open-source operating system. (After all, the service and support from IBM is generally considered a cut above that from Redmond.) Even at the desktop, where Windows is a legally sanctioned monopoly, users are choosing Mac OS X and, at many government sites, even Linux, and finding satisfaction because the real issues of application availability, support and cost are being answered.

If I'm right and the operating system is no longer a critical part of IT's decision-making process, then platform-specific vendors such as Microsoft and Sun will be at a disadvantage compared with the likes of Hewlett-Packard and IBM, which sell and service just about every operating system you can name. If you beat only one drum but your listeners want a symphony, you'll lose your audience.

Of course, Microsoft and Sun have more instruments at their disposal. But when chatting with IT executives, vendor representatives all too often stress their respective platform advantages, when those things matter less and less. I think that's because in both companies there is a fierce competitive tradition centered on their core technologies. It's a tradition that's served them well for two decades. And it persists today.

I recently talked with Paul Harmon, a senior consultant at Arlington, Mass.-based Cutter Consortium, about a report he wrote last month on Microsoft's response to Linux. "Microsoft likes having an enemy because it gives them focus," he told me. And Linux is now the enemy. While that strategy may rally the troops at headquarters, it no longer inspires customers.

Sun, which has modified its initial Linux-is-the-enemy approach, continues to view Microsoft as the evil empire and treats Windows with disdain. To do so is foolish. Sun is in effect telling its customers that they are supporting a wicked company and are stupid for using its products. Seems like a poor marketing strategy to me.

My guess is that the smart people who made these companies great will realize that the operating system game is over. And they'll turn their attention to issues that matter.

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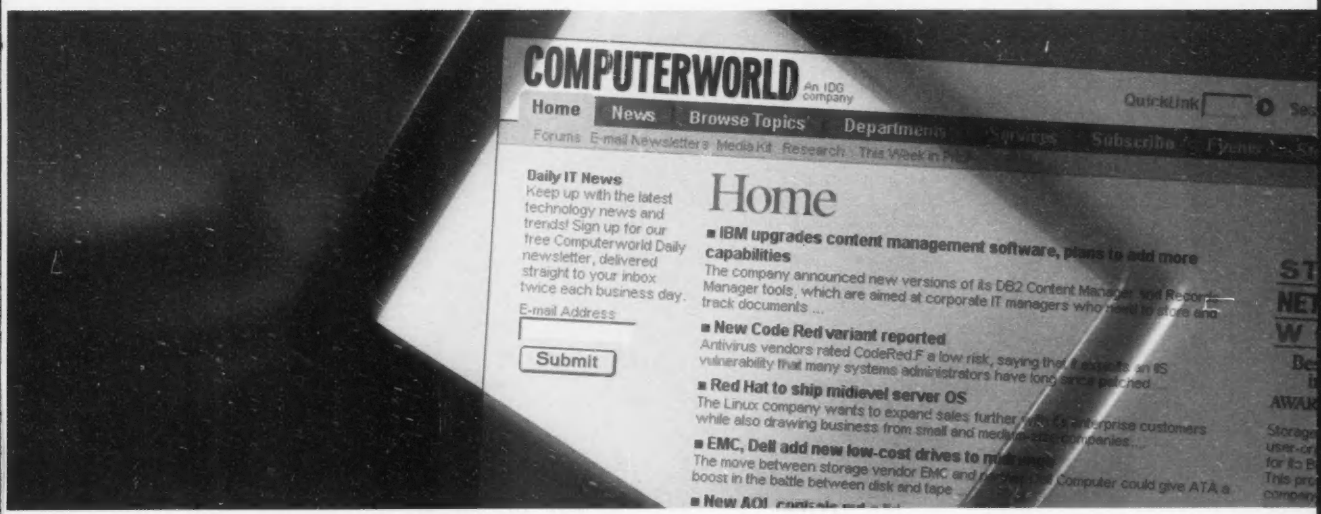


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# The Almanac

An eclectic collection of research and resources. By Mitch Betts

## Windows, Linux Books Coming This Spring

Here's a sampling of forthcoming books about operating systems, as reported by *Publishers Weekly:*

- **Linux on the Mainframe,** by John Eilert, Maria Eisenhaendler, Dorothy Matthaeus and Ingolf Salm (Prentice Hall, May 2003)
- **Inside Windows Server 2003,** by William Boswell (Addison-Wesley, March 2003)
- **Linux Server Hacks,** by Rob Flickenger (O'Reilly, March 2003)
- **Introducing Microsoft Windows Server 2003,** by Jerry Honeycutt (Microsoft Press, March 2003)
- **Microsoft Windows Server 2003 Administrator's Companion,** by Charlie Russel, Sharon Crawford and Jason Gerend (Microsoft Press, April 2003)
- **Linux Security Cookbook,** by Daniel J. Barrett and Richard Silverman (O'Reilly, May 2003)
- **Windows Server 2003: A Beginner's Guide,** by Martin Matthews (Osborne, April 2003)
- **Windows Server 2003: The Complete Reference,** by Kathy Ivens (Osborne, April 2003)

## Do You Need a 'Meta OS'?

As if it's not enough for CIOs to have to migrate to newer versions of Windows or decide whether to jump on the Linux bandwagon, now there's a buzz surrounding the fuzzy concept of a "meta operating system."

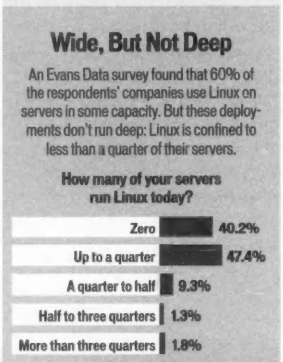
As analyst Amy D. Wohl, president of Wohl Associates in Narberth, Pa., recently explained in "Middleware Spectra," a meta operating system is a grand scheme to use automated tools to help IT organizations configure, monitor, manage and control their entire computing environments. Already, major vendors have meta OS initiatives under way. For example, IBM has its "autonomic computing" effort [QuickLink 32342], and Sun Microsystems Inc. offers N1 management software [QuickLink 33051]. Grid computing, Web services and storage virtualization are also part of the trend, Wohl says.

Meanwhile, she says, "Microsoft will try to create a new scale of operating system where the desktop and the corporate server are merely pieces of some much larger operating system environment which is under Microsoft's control."

The automated management tools of a meta OS could solve a lot of problems for short-handed IT operations, but Wohl's article notes that CIOs will have to be persuaded to let a computer do work now performed by IT staffers.

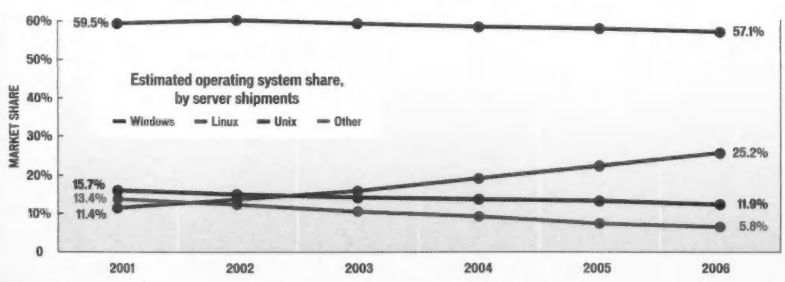
## Wide, But Not Deep

An Evans Data survey found that 60% of the respondents' companies use Linux on servers in some capacity. But these deployments don't run deep: Linux is confined to less than a quarter of their servers.




## Fear the Penguin

Linux is expected to grab a quarter of the worldwide market for server operating systems by 2006




SOURCE: IDC, FRAMINGHAM, MASS., NOVEMBER 2002

## Patent Watch

- **Eye tracking to manage computer resources.** A video camera monitors which application window or display the user is looking at, so a special operating system can allocate more resources to that application or display (and less to the others). For example, if there are two monitors, the monitor that isn't being used will go into standby mode to save power. **Inventor:** Brian R. Nickerson at Intel Corp.
*— U.S. Patent No. 6,526,159, issued Feb. 25*
- **Running multiple Java applications simultaneously, regardless of the operating system and without invoking separate Java interpreters.** An embedded software module sits between the Java virtual machine and the multiple Java applications and allows the open applications to communicate with each other, without conflicts. **Inventor:** Kumanan Yogaratnam at Espial Group Inc., Ottawa.
*— U.S. Patent No. 6,513,158, issued Jan. 28*
- **Intercepting certain operating system messages to make retail kiosks more user-friendly.** Kiosks typically use off-the-shelf PCs and software (to keep costs down), but some of the standard features, such as tool bars, dialog boxes and the right-click of the mouse, are unnecessary or detract from the user experience at public kiosks. Those kiosks need to be foolproof, so a daemon program operates in the background to block selected operating system messages. **Inventors:** Michael T. Madl, William P. Shaouy and Marcus F. Nucci at IBM.
*— U.S. Patent No. 6,513,071, issued Jan. 28*

## Research Roundup

- In a survey of 400 Linux software developers by Evans Data Corp., 94% of respondents said their Linux system hasn't been infected by a virus, and more than 75% said their Linux system has never been hacked.
- The No. 1 barrier to Linux adoption is inertia: Many users are satisfied with their current non-Linux operating systems, according to a survey of 100 IT managers by The Goldman Sachs Group Inc. The No. 2 barrier is the lack of packaged applications available for Linux.
- In an Evans Data survey of 1,000 software developers in China, 65% of the respondents said they expect to write an application for Linux this year, and 44% said they have already done so.

## MORE RESOURCES

Research links and how-to articles are available at:
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# Lowdown on Linux Skills

## What you need to do to learn Linux and land a job that puts your skills to use. By Sharon J. Watson

CAREERS

WHAT DOES IT MEAN for IT professionals now that Linux is finding its way into a growing number of corporate settings?

For systems administrators — the corporate IT people most likely to be affected by Linux adoption — it means they'll have another operating system to learn as their companies capitalize on Linux savings by retraining staffers.

"It's definitely a year of cost containment," says Fran Linhart, director of certifications at The Computing Technology Industry Association Inc. in Oakbrook Terrace, Ill., which offers an entry-level Linux certification. She notes that it's easier and cheaper to retrain existing staffers than to hire new ones. Indeed, employers paid for most of the 20,000-plus professionals certified by Linux Professional Institute Inc. in Brampton, Ontario, through the end of 2002, and for the approximately 6,600 professionals who qualified for the Red Hat Certified Systems Engineer designation.

On the applications side, programmers and developers may be called on to port Unix-based applications to Linux systems or to write new ones. But they won't need to learn new languages: They can develop applications for Linux in C, C++ or Java.

That's the key to Linux, say its supporters. The operating system will revolutionize the cost of back-end servers and create new jobs over time, building on basic programming, networking, administrative and business skills that many professionals already have, say those who use it.

"You don't need to understand business policies and practices any more or less with Linux than with other systems," says Bill Thompson, director of IT at The Sherwin-Williams Co.'s paint stores group. "You still need to meet the needs of the user, and Linux gives you a lot of tools to accomplish that." The Cleveland-based retailer is moving to Turbolinux.

### Skills

In addition to understanding networking basics such as TCP/IP, administrators must know the idiosyncrasies of the commercial Linux distributions their companies run (such as the Red Hat or SuSE distributions). Linux certification programs also test for skills in networking services associated with Linux, including the GNU Object Model Environment, Apache Web server, Samba file sharing and others.

### Training

Unix users in particular find Linux easy to learn. "Anyone who knows Solaris or any major Unix platform could easily switch to Linux," says Brian Dewey, network engineer at Raymour & Flanigan Furniture Co. The Liverpool, N.Y.-based company runs 600 Linux-based terminals in 50 stores, as well as a Linux-based Domain Name System and e-mail, and Apache and Oracle back-end servers.

Dewey says he taught himself Linux the way many professionals recommend learning it: by downloading a free or inexpensive Linux distribution and experimenting with it.

Formal training options include vendor-neutral courses such as those offered by Linux Certified Inc. in San Jose and courses from vendors like Red Hat Inc. Local Linux user groups are also excellent sources of practical information about Linux deployment. Two online sources for Linux information, downloadable distributions and other links are *www.linux.com* and *www.destinationlinux.com*.

### Salary

Linux skills offer a boost to administrator salaries, which have been dropping, says David Foote, president and chief research officer at Foote Partners LLC in New Canaan, Conn., and a *Computerworld* columnist. Systems administrator salaries averaged $78,712 in total compensation last year — a decrease of 9.5% from 2001, according to Foote's "Quarterly IT Professional Salary Survey."

However, bonus pay for Red Hat and Linux Professional Institute certifications increased last year, with the median bonus at 8% of base pay for Red Hat Certified Systems Engineer and at 7% for the Linux Professional Institute's Level 2 certification at year's end, according to the firm's "Quarterly Hot Technical Skills and Certifications Pay Index."

### DOUBLE-EDGED SWORD

Linux adoption is on the rise, but don't expect to see a hiring boom in the field anytime soon. The ease of learning Linux means existing personnel are being retrained:

QuickLink 36551
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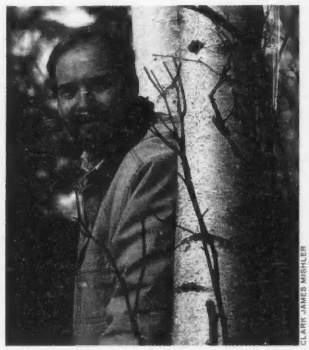


CLARE JAMES MISHLER

## Employee Spotlight

**Name:** BRAD BICE
**Title:** Systems administrator
**Employer:** Alaska Pacific University, Anchorage
**Current IT staff:** Eight
**30-second résumé:** His early career experience included selling and installing hardware, software and networks and full-time technical support at Datatel Inc., a vendor of Unix-based higher education administration systems in Fairfax, Va. He joined Alaska Pacific in 1999, managing a mix of Red Hat Linux-, Unix- and Windows-based servers. One of his first projects was helping to set up two routers using Linux.
**Skills boost:** Bice, who runs Red Hat Linux on his desktop PC at work, offers this advice: "Download a Red Hat distribution, load it on an old PC, buy a basic Linux book, then play with it. Get Linux to dial into your ISP, get the Web browsers up, set up an FTP server – it's very powerful."

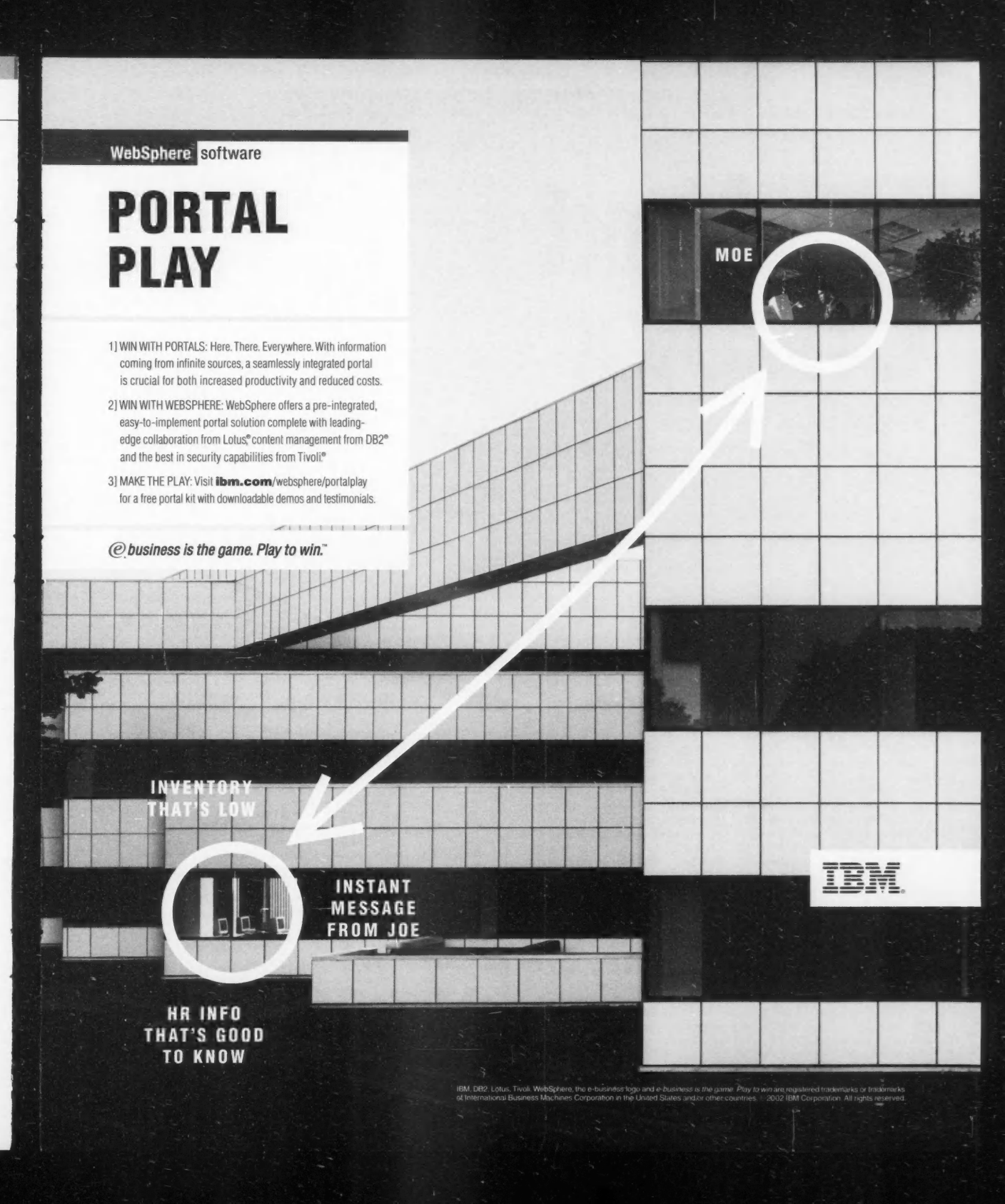
Bice says he picked up his first copy of Linux around 1994 and used it on a home PC not only to learn Linux but also to become versed in Unix skills. "I'd be very comfortable taking someone with deep Linux skills and putting them over a Solaris server," he says.

Learning Linux at home or via classes opens other career doors too, says Bice. Someone could download MySQL and PostgreSQL, learn them on Linux and build a solid background for becoming an Oracle database administrator. "All those skills would transfer," Bice says.

Having a mix of Linux and other operating systems skills and experience will be vital for IT professionals, he predicts. For example, the university is seeking a webmaster to manage its Red Hat Linux Web server running MySQL and PHP. "A Windows guy would be lost on that," Bice says.

But a faculty/student Web server is Windows-based, and the webmaster will be expected to support those applications as well. "We need both skill sets," Bice says.

*Watson is a freelance writer in Chicago. Contact her at sjwatson@interaccess.com.*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# The Next Chapter

**Predictions:** Security will be the No. 1 factor in choosing a server operating system. And Linux will be hugely successful but fragmented.

### MORE IMPORTANT

Server operating systems will continue to ascend in importance as more and more Web services are implemented. The underlying security and reliability models of Windows Server, Solaris and Linux will become the basic points of competition and differentiation. As the use of Web services grows, companies will make server OS selections based on their security and reliability rather than just basic price/performance.

■ *Sheldon Laube, chairman, CenterBeam Inc., Santa Clara, Calif.*

### LESS IMPORTANT

Operating systems will become irrelevant for application development. Instead, developers will write for the next layer up — application servers — for new, Web-enabled applications. Application servers will become the new operating systems by 2005. They are higher-level constructs and offer portability across the old-style operating systems.

■ *Marc Fleury, president, JBoss Group LLC, Atlanta*

### THREE, TWO . . .

Within five years, there will be three prominent server operating systems that dominate the market: Linux, Windows and Solaris. Five years after that, there will be two: Linux and Windows.

In addition, more enterprise functionality will be bundled in the operating system — like Web servers, volume managers, messaging and transaction managers — making the lines between operating system and middleware even more blurred and causing great pain for some enterprise software vendors.

■ *Pete Manca, vice president of software engineering, Egenera Inc., Marlboro, Mass.*

### BYE-BYE, .NET

In April 2004, Microsoft will abandon the .Net platform due to irresolvable scalability problems and the slow adoption of C#. This will cause no discernable change in enterprisewide planning, however, because no one is really sure what .Net is.

■ *Gerald Boyd, director of research, NCS Technologies Inc., Piscataway, N.J.*

### PROPRIETARY DINOSAURS

Proprietary operating systems for servers are the dinosaurs of the Web-enabled world. Over the next five years, server operating systems will inevitably consolidate toward two alternatives: expanded versions of Linux, and Windows running on rapidly scalable blade servers with industry-standard processors.

While a few OS niches may remain for specialized needs, such as nonstop reliability, even these are likely to be provided by extensions.

■ *Shel Travis, vice president of research, MigraTEC Inc., Dallas*

### WEB SERVICES

Support for distributed component architectures and Web services will become a standard embedded layer in all widely used server operating systems. By 2004, Windows, Unix and Linux will evolve to advanced Web services capabilities, such as federation and collaboration features.

■ *Michael Katz, managing director, PricewaterhouseCoopers' Global Technology Centre, Menlo Park, Calif.*

### FINANCIAL SERVICES

Linux and open-source software will experience substantial growth in 2003, particularly in the financial services industry, which has been an early and successful adopter.

As the Web services model for application integration takes hold, Linux and open source will find increasing use, because the specific technical profile of the Web services provider will be irrelevant as long as it complies with the published standard at the interface.

■ *Craig Miller, chief technology officer, Dimension Data North America, Reston, Va.*

### FRAGMENTATION, AGAIN

Within 10 years, Linux on the server side will make up over 75% of the market, but it will become fragmented, just like Unix. The players will be Red Hat Inc., UnitedLinux and various flavors of Linux from hardware vendors such as Dell Computer Corp. and IBM.

■ *Scott Testa, chief operating officer, Mindbridge Software Inc., Norristown, Pa.*

### A WINDOWS WORLD

The winner in the server operating system wars will be the one that does the best job at enabling a robust and easy-to-use Web services framework. Until the major Linux players join together on an effective and uniform Web services strategy, we're destined to live in a Windows world.

■ *Joel Young, vice president, Digi International Inc., Minneapolis*

### SECURITY IS JOB 1

In the wake of Code Red, Nimda and the recent SQL Slammer worm, security will be come *the* determining factor in choosing an operating system during the next 12 months.

The major vendors will be forced to integrate security patch management, nonintrusive upgrades and better logging and detection systems to participate in the corporate world.

Open systems like Linux, running on standardized hardware from traditional vendors, will gain more and more market share due to a fear of Microsoft products' security and license fees.

■ *Jeff Guilfoyle, vice president of systems and security, Solutionary Inc., Omaha*

### WINDOWS ADVANCES

Windows Server will gain increasingly complex features, including workload and partition management capabilities. The sophistication of Unix operating systems' current workload and partition management features will increase as well.

■ *Michael Katz, PricewaterhouseCoopers*

## Uncle Sam Meets The Penguin

**Before the year is out, several state governments and departments of the federal government will announce strategic initiatives to convert all or part of their IT infrastructures to Linux. Government users are attracted to Linux because of the lower cost of ownership (at a time of budget deficits), better security and the use of nonproprietary data formats.** – *Ben Reytblat, co-founder and president, Quadrix Solutions Inc., Piscataway, N.J.*

**Linux will be the operating system of choice in the U.S. Defense Department before 2010, probably by 2005. This is because the system is open, can be fully documented, is secure, supports virtually all processors and is supported by major computer and defense contractors.** – *Chuck Jacobus, CEO, Cybernet Systems Corp., Ann Arbor, Mich.*

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# IT Careers Diversity Report

## Country's Newest Industry Presents Same Face

Despite the rapid growth and intensity of competition for talented professionals, the information technology profession hasn't changed the face of its workforce.

Tyrone Taborn, founder and president of Career Communications Group, Inc. (publisher of US Black Engineer), says the data is clear about the situation. Less than 10% of the IT workforce is comprised of black Americans. There's a continued need for new employees, estimated at better than 500,000 in 2003. Based on a black population that is 12% of the total American population, about 12,000 blacks should be entering the IT workforce this year. Yet, less than 2,000 blacks earned computer, electrical and systems engineering degrees in 2002. Factor in retirements, and the message is clear – the shortage of IT workforce talent isn't getting any better, and among the factors is an inability to attract blacks to IT studies and careers.

Taborn says that companies that ache from the shortage of talent for software developers and systems integrators seldom turn to an apparent source – black students. Nine historically black colleges and universities have accredited engineering programs and are producing 50% of the black IT graduates. That leaves plenty of room for improvement among the more than 300 other accredited degree programs in attracting and matriculating black IT students.

A number of initiatives are underway to push as well as pull enrollment, including the second annual FamilyNet event, held in February during Black History Month. The weeklong event helps push technology into black homes that from a socio-economic stance might not otherwise use IT. Taborn says the effort is designed to also demonstrate to black families that technology can improve their lives – from a healthcare and information standpoint, as well as the ability to expose a new generation early to the jobs of the future – bridging the cliché digital divide.

**Historically Black Colleges & Universities**

**Accreditation Board of Engineering and Technology Institutions with ABET - Accredited Programs**

**Florida A&M State University**

**Howard University (Washington, DC)**

**North Carolina A&T State University**

**Tennessee State University**

The Federal Bureau of Labor Statistics reports that one in seven American workers is employed in information technology; eight out of the 10 fastest growing occupations are IT related. And, one quarter of all job growth through 2008 will come in IT. "It's a myth from the dot-com bust that tech was just a fad," Taborn says. "It has permeated every aspect of the American economy. Opportunities do exist."

One of the errors occurring during the dot-com blast was that more attention was paid to hiring people to push product and service to market rather than developing a highly qualified workforce. Jobs were listed online, and companies waited for applicants with little push to reach out to under-represented populations. The one exception was in the federal contracting segment, where large corporations continued to pay strict attention to increased diversity of workers as well as of the suppliers selected.

Taborn sees this as yet another opportunity. As the information technology infrastructure develops, it's repeating history much as did the building of the nation's railroads and roadways. Taborn calls it first-generation opportunity – first-generation college graduates, first-generation IT workers. "These were national projects that in their infancy weren't standardized. With railroads, the tracks weren't standard at first but moved in that direction. The same situation exists with IT, a movement toward standardization and protocols that will increase reliability, interactivity and security. That movement creates opportunity."

Which brings him to the next first-generation element – business ownership. "Black IT professionals need to generate a different kind of value for communities by setting up their own companies."

## IT Careers

For more information on recruitment advertising, contact:
Nancy J. Percival, Director, Recruitment Advertising at
800-762-2977
500 Old Connecticut Path Framingham, MA 01701
Produced by Carole R. Hedden

Senior Application Developer. Dsgn bus & systm solutions for client req, understand systm dsgn & user interfaces, coordinate systm dsgn w/multiple prgmrs & analysts; write applic code based on analyst systm dsgn & interface, understand systm dsgn & user interfaces, complete tasks per analysts specs. & req.; oversee systms analyst efforts, communicate w/clients, attend internal meetings; keep up-to-date on technologies focusing on lang dev, attend training on dvlpmt technologies, create testing methodologies. BS in Comp Sci, CIS, or related field + 3 yrs exp in job offd or as Prgmr-Analyst or similar duties under different job title. 3 yrs exp w/VB prgmg using COM objects & ASP prgmg. 1 yr exp setting up objects w/MS SQL server; analysis to gather specs; working in team environ for dev & testing of applic specs; COBOL mainframe lang. Demonstrated exp. w/MS ASP.NET. 40 hrs/wk. $54,600/yr. Must have proof of legal authority to work in US. Send resume to IA Workforce Center, 215 Watson Powell Jr., Way Suite 100, Des Moines, IA 50309-1727. Please refer to JO IA1101699. Employer paid ad.

Programmer Analyst to analyze and evaluate existing or proposed systems, and revise computer programs, systems and related procedures to process data. Prepare charts and diagrams to assist in problem analysis, and submit recommendations for solution. Prepare program specifications and diagrams, and develop coding logic flowcharts. Encode, test, debug, and install the operating programs. Bachelor's degree, computer Science, Engineering, or Information Systems and minimum 2 yrs. Experience.

Software Engineer to provide functional and empirical analysis related to the design, development and implementation of software operating systems; including, but not limited to, utility software, development software, and diagnostic software. Participate in the development of test strategies, devices and systems. Bachelor's Degree in Engineering, Computer Science, or Information Systems and minimum 5 years experience, or Masters Degree and 2 years experience. Send resume to PlanetPro at 2893 Sunrise Blvd. Suite 107, Rancho Cordova, CA 95742, Attn: HR, or jperry@planetpro.com.

R Systems, Inc. is a global information technology services company and it has multiple Job openings for the following positions at its corporate office in Sacramento as well as Project sites throughout the United States:

- Applications Programmer
- Database Analyst
- Software Engineers
- Systems Analyst
- Network Analyst
- IT Project Managers
- Business Analyst
- Sales Engineer
- Programmer Analyst
- Sales Manager
- Database Administrators
- Market Research Analyst

Minimum requirement: Bachelor's degree or equivalent and one year experience in the job offered. All positions may involve relocation to project sites.

Submit detailed resume and position applied for to:

Attn: Sanjay Saxena
5000 Windplay Drive Suite 5
El Dorado Hills, CA 95762

CRM Software Development Manager. Multiple openings. Responsibilities include: management including hands-on design, development and implementation of Internet/Intranet/Web-based Customer Relationship Management (CRM) software systems using Microsoft Visual C++, O-O Modeling, COM/COM+, IIS, ASP, XML, XSL, D-HTML, ADO, PL/SQL, T-SQL, SQL Server 2000, Oracle DBMS, Microsoft Transaction Server, Visual Interdev, MS Project, Visio, Commerce Server 2000, Biztalk Server 2000, Rational Rose, Windows 2000 Advanced Server; manage the design and development of n-tiered web architectured applications; and serve as chief liaison with clients. Must have a Bachelor of Science degree in Computer Science or a related field and at least 5 years of progressive experience in software engineering development management. Must have proof of legal authority to work in the United States. If interested, submit resume to: Mr. James Hershey, Director of Client Services , CAS Systems of America, Inc., 1100 Abernathy Road, Building 500, Suite 750, Atlanta, Georgia 30328

Project Manager (web & server tech.) to perform cost benefit analysis (CBA) of data mgmt. systems (DMS), identify b/z reqs., conduct Joint Application Development (JAD) sessions, prepare CBA / bz case rpts. Use .Net & J2EE tech. DMS. Evaluate technologies/ tools to balance project needs, functionality, cost, & user acceptance. Manage projects using RUP, UML, & .Net/J2EE framework. Create functional reqs. & security framework. BS in MIS + 3 yrs. of exp. in job duties (and 2 yrs. of exp. with full life cycle development, methodologies, design tools & testing). Requires Microsoft Certification in SQL Server 2000. Send resume to BCA, Inc., 2180 Satellite Boulevard, #325, Duluth, GA 30097 with proof of permanent work authorization in the United States.

SENIOR SOFTWARE ENGINEERS. IT company requires Software Engineers to work with middleware solutions (J2EE & .NET), web services technologies (XML, XSL, SOAP, WDSL & UDDI), core networking technologies (MPLS, IPSec, AAA, Frame Relay, ATM), IT security technologies (VPN, Firewall, Intrusion Detection System), network design & implementation (Juniper, Lucent, Cisco, Checkpoint & Nortel devices), and ability to develop & respond to RFPs & RFIs. Qualified candidates must perform above duties using languages such as JAVA, C and C++ as well as work in various databases (Oracle, my SQL, etc.) Must have MS in Comp. Science or Comp. Engineering and 2 yrs exp in occupations with similar duties. Send cov ltr/resume to Attn: Ramesh Balakrishnan at Danucom Corp., 106 Apple Street, Suite 203, Tinton Falls, NJ 07724/or email at: resumes@danucom.com

Computer Systems Analyst

Perform the role of Technical Lead. Analyze data processing requirements for software development, using Business Objects, Visual Basic, ASP, J2EE, Java, Weblogic, Data warehousing. Interface with project manager, customers and developers. Req. 2 yrs prev exp. Send resume to BLC Consulting, Human Resources, 26 Jefferson Court, Wethersfield, CT 06109.

GIS Software Quality Control Specialists (Atlanta, GA & Jacksonville, FL): Analyze, design and develop real time apps. to monitor Cable Network outages in GIS and COM+ technologies including MapInfo, MapXtreme, GTViewer, MS Dev. Tools, web technologies, SQL Server and related RDBMS in Win 2000/Citrix. To apply or for complete job description, respond to Think Resources, Inc., Attn: GIS Recruiting, 280 Technology Parkway, Norcross, GA 30092. EOE.

Java Programmer

Design, development, & testing of GUI screens, using Java, Mysql, JDBC. Raise & resolve issues by working w/team members. B.S. in CS or rel. w/abil. to use Java, Mysql, JDBC, PL/SQL, VBScript, HTML, JSP, CGI, LINUX, Informix, Oracle. M.S. accepted in lieu of B.S. 40.0 hr/wk. 9 -5. Resume to Mr. Earl Taylor, Software Manager, etaylor@medisys.md, MediSYS, 7201 Halcyon Summit Dr., Montgomery, AL 36117.

Computer Programmer: Use practical knowl of PowerBuilder, VB langs & MS SQL server d/base envrmts to analyze, dsgn, install, implmt & maintain comp prgms to support info reqmts of employer; prgm applic using object oriented relational modeling techniques; create/modify d/base for user-specified views, forms, reports & stored procedures; code, repair, test & modify prgms to ensure technical & functional accuracy; dsgn & create reporting subsystm & dvlp business reports; train Employer's users in use of applics. 40hr/wk, 9a-5p, $40,600/yr. Bach w/Comp Sci as major & 2 yrs exp in job req. Send resume to: Wanda Castillo, HR Mgr, AFS-USA, Inc, 195 Madison Ave, 8th Fl, NY, NY 10017.

Senior Engineer to plan, coordinate, lead projects for the development of applications for the Power System, ALSTOM ESCA Energy Management and Market Operations using knowledge of power system algorithms, bulk power system & energy market operations. Candidate should have a Masters degree in Electrical Eng or Comp. Sci. with minimum of two years of experience in real time system programming and development of Energy Management System applications in UNIX/C. Also required is hands on work experience with Alstom ESCA EMS and Market Applications. Please send resumes to: Robert Martin ISO-New England, Inc., One Sullivan Road, Holyoke, MA 01040-2841. Fax: (413) 540-4505. Refer to job code: Senior Engineer-AN-PRS-2003. Proof of Permanent employment authorization and salary requirements are a "must."

Application Developer (Monroe, LA): Exp'd dvlpr to dvlp AMOCS billing applications; debug existing applications; assist in implmtg new applics using AMDOCS. Qualified applicant will identify current operating procedures & clarify prgm objectives; analyze, review, & alter prgms to increase efficiency or adapt to new reqmts; write documentation to describe prgm dvlpmt, logic, coding, & corrections; assist users to solve operating problems; identify problems & rewrite prgm to correct errors; oversee installation of hardware & s/ware; provide tech assistance as needed to users. Must have min 3 yrs exp in job offd. Wage/Salary Hourly: $35/hr-$45/hour. FT. Respond to: IT&E Corp., 111 North Market Street, Ste 730, San Jose Ca 95113, Attn: Tony Allocca.

MWH Americas Inc. seeks a Senior Software Engineer to work in Broomfield, Colorado. Create system back up and recovery procedures, design, install and maintain a variety of databases. Engage in data modeling and performance tuning. Install and maintain software applications. The job requires a bachelors degree, software experience, and working knowledge of installing and configuring Windows NT Servers, configuring FTP and SMTP protocols, designing, installing and maintaining multiple databases and data modeling, Crystal Reports and Oracle Forms. Send resumes by mail only to: Dave Sell, MWH Americas, Inc., 380 Interlocken Crescent, Suite 700, Broomfield, CO 80021. Refer to Job Opening Number MWHDEN7SA.

Software Engineer. Analyze s/ware dvlpmt project reqmts; dsgn objects & algorithms; implmt s/ware dvlpmt project solutions; write test cases for quality assurance testing of s/ware. Req: BS in Engg, Comp Sci or related field + 2yrs exp in job offd or as S/ware Dvlpr or similar duties under a different job title. 2 yrs exp w/CAE s/ware dvlpmt, C++ lang & object-oriented modeling, MS Dvlpmt Studio, Windows NT OS. Exp w/modeling real world engg systms w/simulation s/ware. Demonstrated knowl of data architecture & dsgn in engg s/ware systms, incl Comp Aided S/ware Systms. 40hrs/wk, $60K/yr. Must have proof of legal auth to work in US. Send your resume to IA Workforce

IDLogix, Inc., a Concord Risk Management Company, seeks applications for the following positions: programmer analyst & architect (software and electronic engineer) to work in Longmont or Englewood Colorado.

All positions involve the development of embedded software which allows security devices to communicate with host computers.

These positions require a bachelor's degree in computer science, computer engineering or electronic/ electrical engineering. The programmer analyst position requires experience in developing embedded software and related tools, databases and languages. The architect position requires experience in creating designs and schematics for electronic embedded software for electronic devices and assembly languages.

Resumes should be sent to Concord Corporate Services, Inc., Attn: DS/FC 1-1-95, 1100 Carr Road, Wilmington, DE 19809.

Yashoda Systems Inc., the Premier IT consulting and development firm leading the Way into the new millennium with its solutions for all the hi-tech, networking and web based programming needs. We are looking for the following position:

Software Engineers: Research, design, develop, implement and customize Client-Server Applications using Java, J2EE/EJB, C++, XML, Weblogic, JDBC, JNDI, RMI and RDBMS. Outstanding GUI development skills utilizing a variety of technologies including Java Swing, Java Server Pages, Servlets, and CSS. Involve in Database Development by Writing and Implementing Packages, Stored Procedures, Triggers and Functions using PL/SQL. Analyze Business Rules, Solve Production Problems, Redefine and Convert Data to a required Form. Requires a Master's in Computer Science or a related field and 2 years of experience.

Send Resume to: Mr. Vamshi Chinthalapani, Yashoda Systems Inc., 7100 Regency Square, Suite 230-4, Houston, TX-77036 or via email at: resumes@yashodasystems.com

SOFTWARE ENGINEER. Requirements: Design and development in client/server architecture using Oracle database and Oracle software development tools. Database administration. Analysis, design and development of software projects involving Pro*C, PL/SQL, and front-end tools like SQL* Forms. Design and development of software projects using UNIX operating systems and Windows and software developing languages like C. The job duties are: Analyze, design, develop, and implement software projects using Oracle, Pro*C, PL/SQL, GUI tools, etc. Provide user training and documentation. Perform database administration in Unix and Windows. Requires Master's in Computers or equivalent. 40 hours per week at $71,000 per year. Please send 2 copies of resume to Case #200115224, Labor Exchange Office, 19 Staniford St, 1st Floor, Boston, MA 02114.

Software Engineer (Atlanta, GA) Under direct supervision, responsible for the analysis, design, programming, testing, debugging and modification of local, network or internet-related computer programs. Analyze and formulate requirements and design product application features. Create computer programs from design specifications and verify functionality through unit test. Review existing programs or formulate logic for new features using structured programming or object oriented analysis and design techniques. Create or revise application and user documentation to describe new functionality. Review code for accuracy and adherence to methodology. Work in a variety of languages, including Oracle and Java. Requirements: Bachelor's or equivalent degree* in Computer Science, Math, Engineering or related field. (*as determined by a recognized credentials evaluator). Competitive salary offered. Apply on-line at www.retek.com/apply to job req. 00000760. Be sure to include CompWorld as the source code.

Manager of User Interface Software Development sought by NJ based Securities Dealer for Jersey City, NJ office. Must possess Bachelor's degree or equivalent in Computer Science or directly related field and 5 years exp. in software development/design/analysis. Exp. must include C/C++, JAVA, C#. Respond to: Human Resources Department, #KFP03-99, Knight Financial Products, 130 Cheshire Lane, Suite 102, Minnetonka, MN 55305.

Jnr. Programmers. Multiple Positions. Collect info. to help Snr. Progs. analyze, formulate & define specs & develop/ modify client server D/Base. Maintain documentation & guidelines. Req: Bachelors degree in Business Admin. Comp. Sci. Comp. Eng., or Electrical Eng. with 1 year exp. 40hr/wk. Job/Interview Site: Wilmington, DE. Send resume to: VXL Technologies, Inc. 1220 N. Market St., #606, Wilmington, DE 19801.

Seeking qualified applicants for the following positions in Memphis, TN: Senior Systems Programmer. Serve as project/team leader. Devise procedures to solve complex problems with systems/applications. Requirements: Bachelor's degree* in computer science, MIS, engineering or related field plus 5 years of experience in systems/ applications development. Experience with RDBMS; software design; and Java and/or C++ also required. *Master's degree in appropriate field will offset 2 years of general experience. Submit resumes to Sibi George, FedEx Corporate Services, 1900 Summit Tower Blvd., Suite 1400, Orlando, FL 32810. EOE M/F/D/V.

SAP Basis Consultant, Atlanta: Assess client business requirements & provide analysis. Perform capacity planning, system design & configuration of SAP system. Implement, document, maintain & support system. Provide expertise to functional teams. Reengineer & customize where necessary. Specialize in SAP R/3 (ERP) & SAP BW (Data W/house) systems. Requ: Bach. Degree in Bus. Admin. or MIS+2 yrs in job or as Systems Analyst performing SAP Basis Consulting. Mail resume to: HR, Focused Systems, 325 Chelsey Ct, Alpharetta, GA 30004.

PROGRAMMER/ANALYST - Analyze, design, program, implement, test & support advanced software applications utilizing Java, Java Script, Visual Basic, C and C++ under UNIX and/or Windows operating environment for client/server and/or internet-related applications. Responsible for integration of enterprise systems such as Messaging Middleware, CRM and SAP/R3. Req. Bachelors in Comp. Sci., MIS, or Engg (any field) plus 2 yrs exp. Contact: International Systems Technologies, Inc., 1812 Front Street, Scotch Plains, NJ 07076.

PROGRAMMER/ANALYST - Analyze, design, program, implement & support advanced comp. applications utilizing JAVA-based Bluestone Software, Java, Java Script, ODBC, HTML, C and C++ under UNIX and/or Windows operating environment for client/server and/or internet-related applications. Req: Bachelors in Comp. Sci., MIS, or Engg (any field) plus 3 yrs exp. Contact: International Systems Technologies, Inc., 1812 Front Street, Scotch Plains, NJ 07076.

Software Developer wanted by IT comp in NYC to design, develop and implement J2EE. Use XML JavaScript, Sybase, HTML, MS SQL, Weblogic, EJB and other tools. Resumes to Vitech Systems Group, 401 Park Ave South, NY, NY 10016.

Software Analyst needed to dvlp & support high-performance affiliate tracking (OLTP) s/ware using Mod-Perl, PostgreSQL, C, HTML, JavaScript; provide systm admin on FreeBSD & Linux servers; dsgn & support TCP-IP networks for Cisco router admin. Apply to: TrackingSoft, 124 S. Church St, Rogersville, TN 37857.

Hetrosys, LLC, based in Detroit, Michigan seeks Senior UNIX System Administrators and Senior Database Administrators for Detroit and nation-wide opportunities. All positions require B.S. in Computer Science. UNIX position requires two years high availibility experience and MC/Service Guard certification. Database positions require two years experience in decision support application development or data warehousing in addition to standard suite of ORACLE administration tools. Apply via U.S. Mail with resume to Hetrosys, LLC, 3757 S. Baldwin Road #223, Lake Orion, MI 48359.

Arcadia Services is looking for System or other IT consultants to join this dynamic company. Applicants must have BS degree. Experience in Power Builder, Sybase, window NT, Visual Interdev is plus. Please send resume to 26777 Center Park Blvd, Southfield, MI 48076. EOE.

MIS/Programmer Analyst wanted by Driktech, LLC, a small fast growing company. Candidates must have minimum bachelor's degree with exp. in IT project management and sales. Attractive wage with full benefits. Please contact 1850 Timber Trail, Ann Arbor, MI 48103. EOE.

Web Designers/Developers for IT co. in Morrisville, PA w/foll skill sets: Java Server Page, Rational Rose, Javascript, Perl, Cold Fusion, Oracle & Active Server Pages. Bach/equiv in MIS, Engg., Comp Sci or equiv + 6 mnths exp in job off. Apply to Cyberfuse Tech, 81 Big Oak Rd, #100, Morrisville, PA 19067 215-428-6846 (F), e-mail: careers@cyberfuse.com

Software Engineers & Programmers. Design, develop, test and implement specialized software apps. in multi-systems envt. in (i) Oracle 11i Apps. (Property Management, Manufacturing, Financial & HR), Noetix Servers, NQS Admin. and related technologies; (ii) LotusNotes, Domino, UML, J2EE, Microsoft Web Technologies and RDBMS. To apply or for complete job info - HR, Apps Associates, LLC, 9 East Loockerman Street, Suite 1B, Dover, DE 19901, US Workers Only. EOE.

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IT careers

PROGRAMMER ANALYSTS req'd for Chicago, IL office. Design & Develop software applications using C, C++, VB, Delphi, ASP, XML, UML, Coolgen, Interwoven, Oracle, PL/SQL, Developer 2000 & Designer 2000; Perform system & integration testing. Bachelors req'd in Computers, Engineering, math or related field of study +2 yrs of related exp. 40 hrs/wk. Must have legal authority to work permanently in the U.S. Send resume to HR Manager, Allied Business Consulting, Inc., 2906 Merry Wood Drive, Edison, NJ-08817

System Analyst for Lewis Center OH to analyze user req., design, develop Internet driven business and commercial applications. Must have knowledge of using UNIX (Solaris) Java, CGI scripting, Perl, JavaScript, JSP Language, JDSC and RMI, working with Java classes, interfaces, and COM components to make software more scalable and efficient. Improve existing computer system; troubleshoot. Bachelor's degree in information science. Resumes to: 8185 Green Meadows Dr. N Unit U, Lewis Center, OH 43035. EOE. No calls.

Software Specialist - Needed for NE OH to design, develop, and support various web-based applications. Design and implementation of relational database (DBMS /SQL) components, development and support of intranet and client-related external systems. Must have baccalaureate degree in Finance or equivalent. Min 3 years exp with knowledge of mixed SQL Server, strong Microsoft Access skill, SCO Unix, Novell NetWare environment, ASP, ADO/MDAC, HTML, D-HTML JV. Resume to: e-JobAds, Box 127, 27113 Brookpark Rd. Ext., North Olmsted, OH 44070. EOE

Senior Software Engineer – analyze, design, develop, test & maintain eGovernment applications/ products using knowledge of & exp. w/ Java, Java Swing, Java Servlets, Apache Web Server, Jrun, Jserve, Resin, Tomcat, Oracle iAS, C/C++, MS Visual C++, MFC, STL, Visual Basic, HTML, Unix Shell Scripts, Oracle & MS SQL Server RDBMS, CORBA, JDBC, Unix (Sun Solaris) & Windows 2000/NT; develop object model/use cases & class diagrams in UML. Requires BS degree in computer science or computer engineering + 5 YR related experience. Interested candidates e-mail resumes to robert@ark.org.

Programmer/Analysts needed. Seeking candidates possessing BS or equivalent and/or relevant work experience. Part of the req. rel. work exp. must include 2 years using Oracle. Duties include: Analyze, plan and define program objectives; Gather information; Convert design specifications to applications; Modify systems. Work with Oracle, PL/SQL, JSP, Java and C/C++. Mail resume, references and salary requirements to: Intertek Testing Services Int'l Inc., 3741 Red Bluff Road, Suite 100, Pasadena, TX 77503.

SOFTWARE ENGINEERS for Bloomington, IL office. Design & implement mobile commerce applications using PALM, RIM, ECRM, ASIC, UML, XML, BLUETOOTH, Data warehousing, C++, OOD, Java, Solaris with cross platform ability to develop applications on client/server systems, configuration of Oracle, UDB database on real-time application with 500GB. Bachelors degree req'd in Computers/Engineering + 2yrs of exp. Must have legal authority to work permanently in the U.S. 40hrs/wk. Please send resume to HR Manager, DoingWap .Net,Inc. 316 Eisenhower Parkway, Lower Level, Livingston, New Jersey-07039.

PowerBuilder Programmer sought by a telco company to work on design database & develop related application systems. BS in computer science and 1.5 years experience in PowerBuilder development required. Send resume to IT-ClientServer, WCI. d/b/a Logix Communications, 2950 North Loop W., STE 1200, Houston, TX 77092.

Arcadia Services is looking for System or other IT consultants to join this dynamic company. Applicants must have BS degree. Experience in Power Builder, Sybase, window NT, Visual Interdev is plus. Please send resume to 26777 Center Park Blvd, Southfield, MI 48076. EOE.

MIS/Programmer Analyst wanted by Driktech, LLC, a small fast growing company. Candidates must have minimum bachelor's degree with exp. in IT project management and sales. Attractive wage with full benefits. Please contact 1850 Timber Trail, Ann Arbor, MI 48103. EOE.

**Principal Software Engineer (Lake Forest, CA):** Research & design s/w for continuous, discrete & batch manufact; apply C#, C++, COM, XML, XSL, HTML & .NET to design s/w in WinNT and XP; apply by resume: Job #WW/SK, Staffing, Invensys Systems, Inc. 26561 Rancho Parkway South, Lake Forest, CA 92630 or employment@wonderware.com. EOE.

LLEORNA Enterprises, a provider of software consulting services, seeks:

Senior Systems Integration Engineer. BS or equivalent in Computer Sci, Engineering or related + 6 yrs exp in SW engrng, programming or related. Also 2 yrs exp in Windows & Unix systems admin; knowledge/backgrnd in: RDBMS; CGI; and Perl, C++ or Java; backgrnd in power utilities/ energy industry. Mail resume to: 2243 Shannon Dr., South San Francisco, CA 94080.

COMPUTER

**PeopleSoft** has opportunities for technical and marketing professionals in California (Pleasanton, San Mateo, Santa Clara, Encino, Irvine, and other locations), Bethesda, MD, Waltham, MA, Teaneck, NJ, Atlanta, GA, Dallas, TX, Miami, FL and various other locations within the U.S. for the following:

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For consideration, please send your resume to **PeopleSoft, Inc., Attn: Human Resources Manager, 2377 Gold Meadow Way, Suite 110, Gold River, CA 95670** or email to: **hrmanager@peoplesoft.com**. We support workforce diversity. Please also visit one of the following websites: **www.peoplesoft.com, www.monster.com** or **www.caljobs.com**.

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Computer

As a $180 million industry leader, we are able to provide our people with the kind of work environment, opportunities, benefits, growth potential and progressive training others can't match. We are looking for IT professionals with a minimum of 1+ years experience for the following job titles:

- PROGRAMMER/ANALYST
- SYSTEMS ANALYST
- SYSTEMS PROGRAMMER
- DATABASE ADMINISTRATOR
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The Pepsi Bottling Group is seeking a Supply Chain Developer-Somers, NY. Candidate will lead implementations of i2 Demand Planner application and integrate them with i2's Supply Chain Management suite of products, as well as Enterprise Resource Planning Systems. Will implement i2's Factory Planner application. Will develop the solution, training documentation, trained users and implementers on the technical and functional aspects of this solution. Will communication with Product Support and Development regarding application/solution enhancements and provide specifications for those enhancements when required. Will use knowledge of writing SQL calls and TOAD software to retrieve data from data warehoused within Oracle databases. Will interact with end users to: (a) determine best statistical analysis tools and algorithms to use for forecasting business trends, sales and costs by using statistical forecasting techniques such as, including Multivariate Regression, Triple Exponential Smoothing, Bayesian Statistics, Box-Jones Jenkins and Croston's method; and (b) use knowledge of production planning and scheduling techniques such as Heuristic and Linear and Integer programming optimization algorithms, and operational techniques including Just In Time, Lean Manufacturing, Theory Constraints, Time Study Analysis, Dynamic Stock Replenishment Models, Material Requirements Planning (MRP) to deploy factory scheduling and network optimization applications to reduce production costs. Please fax resumes to J. Abena Aggrey at (914) 767-1082. No phone calls please.

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The Pepsi Bottling Group is seeking a Senior Software Developer-Somers, NY. Candidate will design, develop, debug, integrate and implement software for handheld PCs used by sales representatives of carbonated soft drink manufacturer to forecast future needs of retail sellers based on seasonal and special promotion consumption variables, current inventories and historical sales and price variables. Software will incorporate embedded and Wireless (802.11b) technology to allow handheld PCs to transfer data to and from mainframe Raima database and Sybase database software. Developed software will also integrate field data with mainframe database to create sales reports, maintain distributor center inventory, and insure proper inventory load levels of delivery vehicles. Will design, develop and implement multi-user client server tools to aid the regression and integration testing of this software. Will use knowledge of NextGen, Visual C++, Java, HTML, XML, PowerBuilder, Visual BASIC, VBA and Sybase SQL stored procedures to perform duties. Will provide on call production support to field users. Travel required. Please fax resumes to J. Abena Aggrey at (914) 767-1082 and reference job # CN01. No phone calls please.

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Vision Engineer. Requires a Master's degree or foreign equiv. in Info. Tech., Engineering, or a rel. technical field. Must have 4 yrs. of exp. in the job offered or 4 yrs of exp. performing engineering in the info. tech. industry. Stated exp. or educ. must include 4 yrs. of programming with C++. (At least 2 yrs. of this exp. must have been gained through exp. in the industry.) Must have exp. implementing distributed computing, using database technologies, training or teaching technical subjects, & enhancing a large, existing software system. Design, engineer, implement (using C++) & test new features in the Vision database product including new primitive functions in the Vision language, enhancements to database functionality (e.g., concurrency control, garbage collection,) & enabling the Vision engine to participate in a distributed computing environ. 40 hrs/wk. Job located in Boston, MA. Send resume to C. Kuhlman, FactSet Research Systems Inc., One Federal Street, 21st Fl., Boston, MA 02110.

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Supply Chain Business Analyst (multiple openings). Glendale, CA. Bach. degree or higher (or equivalent foreign education) in eng., operations research or related field & 2 yrs.' exp. in job offered or 2 yrs.' exp. (may be gained prior to degree completion) in dvlpmnt & implementation of decision support models incl. database dvlpmnt or programming. Stated exp. must include at least 1 yr. in a mfg. or supply chain environment. Coordinate effective dvlpmnt & implementation of quantitative methodologies & operations research for supply chain operations through dvlpmnt and implementation of decision support models incl. database dvlpmnt & programming. Optimize supply chain's performance by reducing operation costs & the risks associated w/ commercial operations. Apply w/ resume to: M. Simo, Nestle USA, Inc., 800 N. Brand Blvd, Glendale, CA 91203. NO PHONE CALLS OR THIRD-PARTY AGENTS PLEASE.

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Position opening for exp'd IT professionals with the following skills: Netgrity LDAP Servers, Pramati 3.x, Java, STRUTS, WSDL, JAX-RPC, Caldera Linux, etc. B.S. or equiv. in C/S or Eng'g (any branch), reqd. Travel/reloc. reqd. Please send resumes only to Paramount Software Solutions, Inc., 3350 Riverwood Pkwy., Suite 1900, Atlanta, GA 30339

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SR. SOFTWARE ENG Design & implement complex operating software applications. B.A. Comp Science/Math or equiv. & 8 years Sr. programming experience, must be proficient in Java, C++, J2EE & OO programming. Apply to: Harland Co., Attn: L. Leinard, 2939 Miller Road, Atlanta, Ga 30035.

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Level 3 Communications, Inc. is seeking a Manager of Network Engineers for Broomfield, CO. Candidate will direct and supervise voice and IP transmission network engineers who are responsible for estimating equipment needs, network use, and budget requirements needed to provide rapid ( 7 days or less) on line ordering and connection of wavelength and optical multiplex telecommunications services in North America and Europe. Will direct and supervise voice and IP transmission network engineers who will use detailed knowledge of fiber optic systems including Dense Wave Division Multiplexing, optical amplifiers and North American and Euro-Asia SONET protocols to ensure that projected network capacity is properly optimized to meet required rapid on line connection capabilities. Will direct and supervise voice and IP transmission network engineers who will make optimization requirements by determining: (1) required amount of owned and lease fiber optic networks; (2) proper equipment selection, proper geographic equipment placement; (3) required network design, (4) and by interacting with equipment suppliers, construction and operating departments to insure fiber optic network expansion is achieved. Will also direct and supervise voice and IP transmission network engineers who are responsible for estimating the capital expenditure, operating and network maintenance costs required to meet projected network usage as annual expense budgets in excess of 250 million dollars can be calculated. Candidate must be a licensed professional engineer. Please email resumes to renate.dykman@level3.com. Reference job title when applying. No phone calls please.

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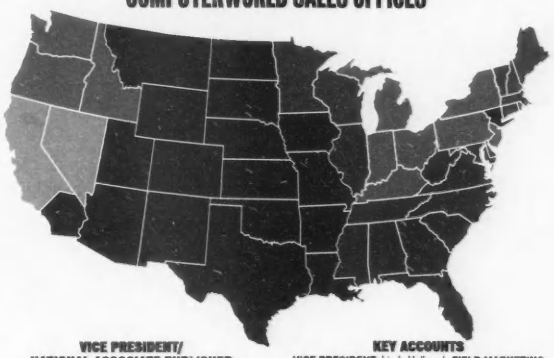

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## IBM

upgrade of DB2 Content Manager in late April.

Version 8.2 has built-in integration with customer relationship management (CRM) applications from Siebel Systems Inc. and PeopleSoft Inc. That will let end users open documents and other types of nonrelational data from within the CRM software, said Brett MacIntyre, vice president of content management and information integration at IBM.

The company also announced an upgrade of DB2 Records Manager, which tracks documents that need to be retained to comply with regulatory requirements. The upgrade is IBM's first since it bought the technology by acquiring Ottawa-based Tarian Software Corp. in November.

IBM said it plans to add a version of DB2 Content Manager for small and midsize companies by the third quarter. In the same time frame, the vendor plans to take initial steps to provide native integration with its Notes/Domino collaboration tools. Also, IBM is tying DB2 Content Manager to its digital rights management software, letting users enforce data privacy rules and control access to information when documents are sent beyond the users' own networks.

David Holland, CIO at Genesys Health System in Flint, Mich., said digital rights management will help Genesys ensure that it meets regulations governing the privacy of patient data when it sends medical records to other health care providers.

Genesys uses DB2 Content Manager with electronic medical records software developed by BlueWare Inc. in Cadillac, Mich. Some 600,000 documents are added to the system each month, Holland said.

IBM's moves to integrate DB2 Content Manager with its other products are also helpful, Holland said.

"I'm not only a Content Manager shop," he noted. "I'm also a Tivoli shop and a Notes/Domino shop and a WebSphere shop. As all these things come together, it just makes my life easier." ▶

## Data Chief Expects Big Things From Content Tools

Q&A

**Janet Perna**, general manager of IBM's data management division, last week spoke to *Computerworld* about her plan to use DB2 as an underlying technology for managing information stored in other databases or content repositories.

**How do you expect sales of DB2 and your content management and integration tools to compare?** The relational database is still a larger overall opportunity, but it's projected to grow in single digits. Content management is projected to grow in the 20% to 30% range. Within the next couple of years, it will become almost as large as databases are.

**Why do you think your Xperanto federated database technology is worth doing?** [Companies] have information stored in many different places. When they want a view of their customers, they don't want to move the information to a central place. They want to be able to aggregate the information and access it from where it is now.

*– Craig Stedman*

### MORE ONLINE

To read an expanded version of this interview, go to our Web site:

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## IBM's New Content Management Software

**DB2 CONTENT MANAGER VERSION 8.2:**

- Adds integration with **Siebel and PeopleSoft CRM applications**, plus support for caching content on LANs.
- Due to ship April 30 on **Unix, Windows and mainframe systems**; costs $24,000 per server, plus $2,000 for each concurrent user.

**DB2 RECORDS MANAGER VERSION 2.1:**

- Adds full integration with **DB2 Content Manager and DB2 Universal Database**, plus a redesigned user interface.
- Due to ship March 31 on **Windows 2000 servers**; costs $24,000 per server, plus $250 for each concurrent user.

*Continued from page 1*

## Bar Codes

bar codes to drugs at a cost to a 150-bed hospital of $162,000 per year. That compares with a one-time cost of $250,000 to equip the hospital with bar-code technology and systems, she said.

Jeff Schou, director of worldwide health care markets at Symbol Technologies Inc. in Holtsville, N.Y., estimated that close to $1 billion will be spent on wireless LAN technology to provide connectivity for nurses dispensing drugs bedside. Schou said there are roughly 6,000 hospitals in the country and only 7% of them have installed WLANs. He estimated the cost of installing WLANs at hospitals that lack such systems at between $50,000 and $500,000 each, depending on the size of the facility.

Schou said the bar code readers could function in a batch, or disconnected, mode, but he added that WLANs will be the best way to manage the system.

Steve Rough, director of pharmacy at the University of Wisconsin Hospital and Clinics in Madison, agreed, noting that batch mode doesn't provide nurses with real-time information — a key to medication management.

The University of Wisconsin started deploying a medication management system, Admin-Rx from San Francisco-based McKesson Corp., in December 2001. That system incorporates bar codes, and according to Rough, it will revolutionize patient care and safety. Rough said the hospital has experienced an 87% reduction in the number of medication errors.

That's because the bar-code system provides multiple checks to ensure that a patient receives the correct drug. When nurses dispense medications, they first scan a bar code on their badges and then the code on the patient's bracelet and finally the code on the drug. This information is sent to a back-end database, which contains patient and prescription information.

Rough said the cost of wireless LANs could be spread over multiple applications, including computerized physician order entry systems and supply systems. While he declined to detail his costs to install the McKesson Admin-Rx system, he said a hospital his size should anticipate spending "a couple of million dollars over a five-year period."

Marybeth Navarra, director of patient safety at McKesson's Automation Group, called the FDA's bar-code regulations a "huge step forward" in the quest to eliminate patient errors. She said the regulations would also help break a standoff between pharmaceutical manufacturers, resellers and hospitals over the use of bar codes. The manufacturers didn't want to use bar codes because the hospitals didn't have readers, while the hospitals didn't want to install the technology because so few drugs had the bar codes.

Total costs for hardware and software for a 125-bed hospital would run about $200,000, Navarra said. A hospital that size with no wireless LAN, would add another $50,000 to hardware costs, she said.

The bar-code regulations will go into effect three years after the FDA publishes its final rules. That's expected to happen later this year, after the agency assesses comments filed in the next 90 days. ▶

## FDA Drug Bar-Code Rules:

Will require manufacturers to put bar codes on individual drug doses by 2006.

Are expected to prevent 413,000 medication errors over the next 20 years.

Will cost the 6,000-plus hospitals in the U.S. $7.2 billion to acquire and install bar-code technology. Most hospitals will probably need to install WLANs to support bar code readers used by floor and ward nurses, with total costs of $1 billion.

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FRANK HAYES ■ FRANKLY SPEAKING

# Outsourcing Angst

VIVEK PAUL IS WORRIED, and he has reason to be. He figures the clock is ticking on the software engineers who work for him today. Paul told a reporter last week that in as little as two years, it may be possible for much of that programming to be done in another country for a lot less money. In other words, Paul is facing the same offshore outsourcing threat as many U.S. programmers.

But Vivek Paul runs Wipro, one of India's biggest software development outfits. And he's looking over his shoulder at offshore programmers in Vietnam, China and the Philippines.

Paul told the AFP news service that salary costs in India are going up and that the seriously undervalued rupee could gain 20% to 30% against the dollar. That would eat away at the cost advantages of offshoring programming work to India.

Meanwhile, programming companies in other lower-wage countries figure they can move into the vacuum as Indian costs rise. They're building their own armies of C++ and Java programmers and aiming to do to the Indian software business what India is doing to us.

All of which is good news for U.S. IT department budgets. And it's actually not such bad news for U.S. programmers, either.

It's good news for IT budgets because competition will drive down the price of offshore software development. Right now, a typical big project costs 30% less in India than it would using U.S. outsourcers. That's largely because a typical Indian software engineer makes 88% less than a U.S. programmer. (Long-distance development adds other costs that reduce the potential savings.)

If programming shops in the Far East can mimic the Indian approach — which they're busy trying to do right now — the number of alternatives for an IT shop that's offshoring a big project will go way up. Competitive bidding will cut offshoring prices to the bone. Lean-and-hungry newcomers will keep the old-guard offshorers honest and on their toes.

That means we'll spend less and get more for the money we do spend. And who knows, maybe we'll even get to plow the savings into interesting new technologies.

On the other hand, for U.S. programmers facing an uncertain future, this may sound like the worst possible news: one more nail in the coffin for code jockeys who see their jobs evaporating as projects are shipped overseas. But don't kid yourself. There wasn't that much left to lose.

Look, we can't compete for projects that can be shifted offshore — not without some kind of programming fairy dust. Cutting an American programmer's salary by 30% to match offshoring prices isn't a viable option. Nor can U.S. companies simply decide not to send any projects offshore. No business can stay in the game while competitors get lower costs and greater flexibility on a key commodity, which is what big-project programming has become.

Offshoring is real, it's going on, and it's going to get bigger. There's a glut of generic programming talent worldwide, and the Internet makes it possible to tap that glut for big projects that need generic programmers. Within a few years, if a project can be offshored, it will be — whether it's to India or Russia or China or the Philippines.

So if you're a programmer in a U.S. IT shop, the future isn't really uncertain at all. It's a dead certainty that generic, big-project coding no longer has a future for you. And it's certain that you'll need to shift away from a pure coding focus, and toward smaller projects that require faster turnaround, specialized skills or an intimate knowledge of your organization — in short, the things offshore code shops can't compete with.

That way, you'll be able to add more IT value than ever. And you won't have to look over your shoulder anymore.

You can let the offshorers do that.

FRANK HAYES, *Computerworld*'s senior news columnist, has covered IT for more than 20 years. Contact him at frank_hayes@computerworld.com.

## SHARK TANK

### What's Really Important

This VP wants a second laptop to use during the few hours a week she's at the main office. That'll bust our budget, says IT pilot fish. Can't she bring in the one she's already got? "She says it's too heavy," says fish's boss. Well, if she won't be carrying this one either, can I just install a desktop PC to save money? fish asks. "No," says boss, "she says that would not promote the perception of a VP on the move."

### Aha!

Is the comma key really broken on every PC in this user's department, as the work order says? Turns out they're using a new database application, pilot fish sighs: "They used to enter names in 'last name, first name' format. Now last name and first name are in separate fields, and commas are disabled. Once we explained that they should use the Tab key, they were happy."

### Out to Lunch

Tech support pilot fish starts eating lunch at his desk to save money. But every day for the first week, users start calling with problems just as he sits down to his soup or noodles. Then he notices a coincidence: "Turns out network connectivity is sporadic in the minutes before the problems appear – precisely when my food is cooking in my office microwave," fish says. "We moved it to a different circuit than the network switch."

### Top Secret

Nontechie CIO lays into network admin pilot fish for "privacy lapses." What privacy lapses? fish asks? Boss points to the company's Web-based e-mail log-on page, which reminds employees to enter their full e-mail addresses, including the "@ourcompany.com" part. That's confidential information! boss says. "What?" says baffled fish. "You think people don't know our e-mail addresses and in '@ourcompany.com'?"

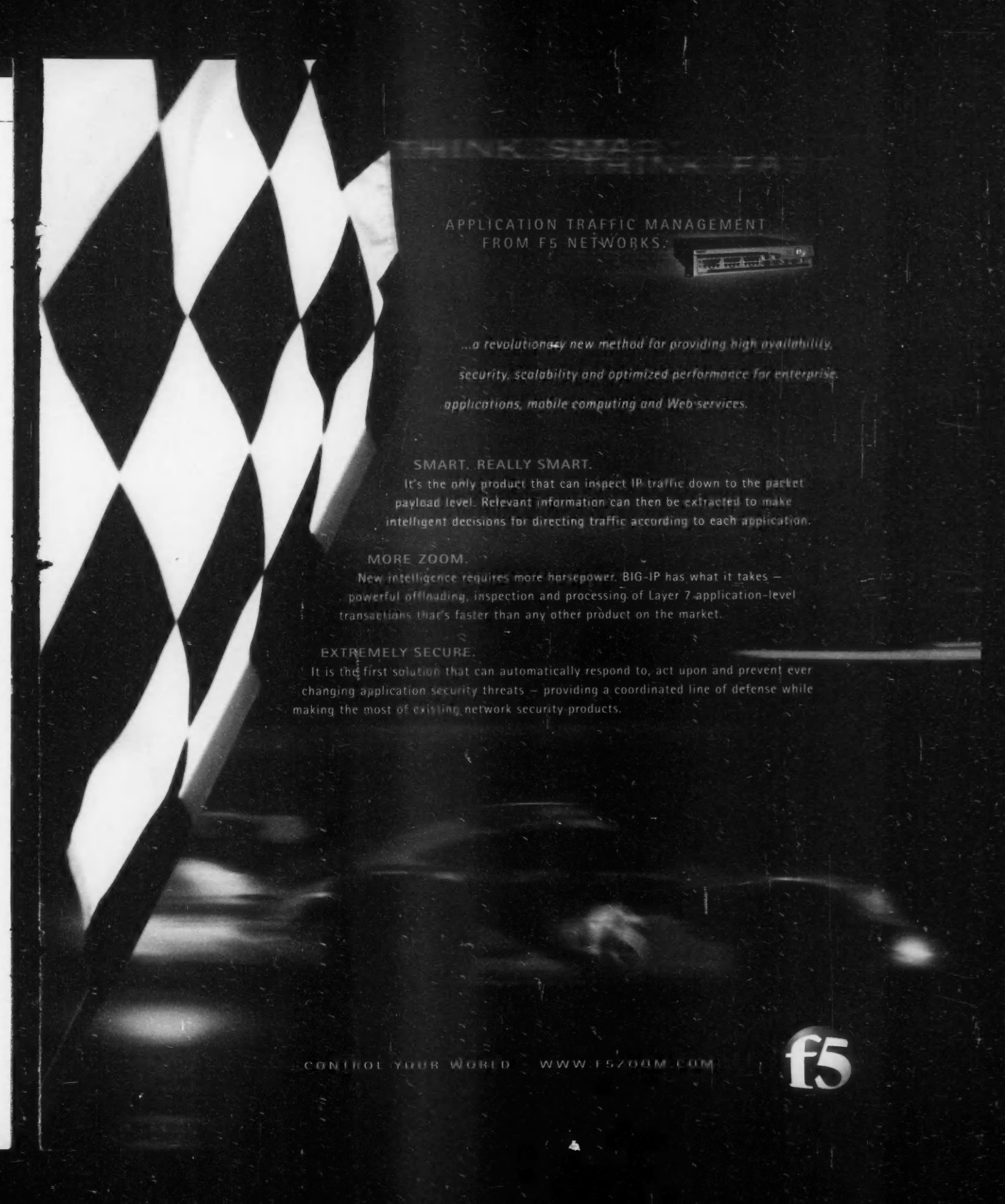
### Good Description

User complains to support pilot fish that her floppy drive is "eating diskettes." Show me, he says. "She put a diskette in the slot, and you could hear it hit the motherboard," fish says. "Someone had taken the floppy drive and left the drive cover in place. I found four diskettes on the motherboard."

### That'll Do It

This user tells document management pilot fish that mice are invading his department's file cabinets and eating the paper documents. "I'd be happy to set up a folder structure in our document management system and set up training and a plan for scanning your documents," fish tells him. "Thanks anyway," says user. "What we really need is an exterminator!"

**FEED THE SHARK!** Send your true tale of IT life to sharky@computerworld.com. You snag a snazzy Shark shirt if we use it. And check out the daily feed, browse the Sharkives and sign up for Shark Tank home delivery at computerworld.com/sharky.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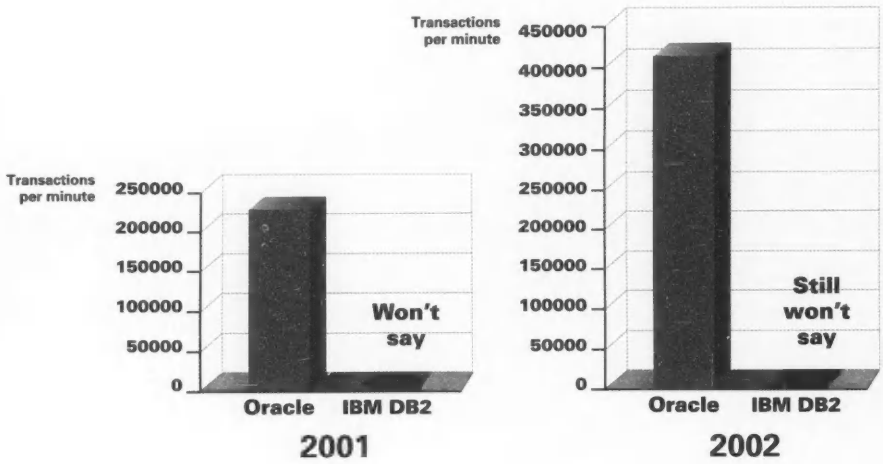


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